



*The better solution for
your measuring task!*



MEASURING SYSTEMS FOR PREMIUM DRINKS

PARTNER OF THE BEVERAGE AND BREWING INDUSTRY SINCE 1982

www.acm.co.at

Every idea shows
a way and it
takes courageous
people to walk it
for the first time.

History

ACM was founded in 1982 as an engineer association.

Our business fields are:
Automation of industrial processes, **C**omputer technologies for data capture and processing, **M**easuring systems for process and laboratory.

Most of the measuring systems are in-house productions. Measuring parameters are density, original gravity, alcohol and dissolved CO₂. All of the programmes and software solutions are in-house developments. The end customers are solely the beverage and soft drink industries.

Our measuring systems are used worldwide. The company headquarters with the departments development, production and export is situated in Vienna Austria. Worldwide Sales is coordinated via the Sales Office in Berlin, Germany, opened in 2003. In Germany, Austria, Switzerland and Hungary sales activities are handled directly via **ACM**.

ACM has representatives in the UK, Scandinavia, Italy, Spain, Portugal, Czech Republic/Slovakia, Poland, Russia, Ukraine, Greece, Turkey, Israel, India, Pakistan, Taiwan, Australia and in China. Some more country representatives and OEM-partnerships are being established.

OEM like **FAMIX, VAN DER MOLEN, WILD/INDAG, GEA TDS, KRONES, PAT, HORMES, RULAND EC, SPX-APV, KHS, ACTEMIUM** and a lot more are our clients.

Pioneering Spirit

Settlers who enter a new country, mountain climbers who climb first on the top of a mountain, explorer who make accessible a new knowledge. It is this same impulse to new knowledge, that is driving us, at ACM and we see ourselves as pioneers in the optical measuring system.

1995 we already took a new path with the Laserrefractometer. Today this technique is the most accurate Processrefractometer! Thanks to the collaboration with international universities and specialists we could develop our extensive Know-How!

To the astonishment of our competitors, we stayed uncompromised to our motto: Each idea shows a way and we need brave people to go there for the first time.

It is that pioneering spirit that is driving us in our daily work, and made us reach our market position in the sector of contact free non-destructive measuring systems with the LAB. CO and the LAB.N2 , in only a few years.

Find out, how you could use our pioneering spirit for your company.

ACM - Measuring technique:
*Made with spirit, heart
and soul of engineers.
Developped and designed
in Vienna.*

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Applications



Juice

Concentrate makers

- °BRIX
- > Fruit pick-up control (LR.10)
- > Feed control for concentrate making devices (LR.10, LR.13)
- > Product end control monitoring at filling (LR.13)

Juice makers

- °BRIX
- > Mixing monitoring (LR.10)
- > Sugar dissolvers, usually applied for sweetening juice concentrates and juices (LR.11)
- > Filling control / hot filling / cold (sterile) filling+ mixing control (LR.10)
- > Phase separation after mixer / after flash pasteurizer (LR.10/LR.14)
- > Storage tanks (LR.15)



Sugar Industry

°BRIX Saccharosis: Liquid (pre)-sugar monitoring of all process stages

- > Thin juice (LR.10)
- > Thick juice (LR.11/LR.13)
- > Active carbon purifying (LR.13)
- > After resolving crystalline / sugar final liquid sugar control (LR.13)
- > Molasse measurement (LR.13)

Corn-syrup

- > After ion-exchanger purifying (LR.10, LR.13)
- > Final liquid corn-syrup control (LR.10, LR.13)



Soft drinks

Syrup room

- °BRIX
- > Sugar dissolver (LR.11 / LR.13)
- > Ready made syrup monitoring (LR.13)
- > Storage tanks (LR.16)

Mixing / blending

- °BRIX / %DIET, CO₂
- > Mixer monitoring (LR.10 + CO.20)
- > Phase separation between mixer and flash pasteurizer (LR.10 / LR.14)

Filling

- °BRIX / %DIET, CO₂ & O₂
- > Product end control monitoring (LR.10, CO.f0, OX.40)
- > Phase separation e.g. at filler (LR.14)



Dairy

- > Sugar dissolver, liquid sugar adding (LR.11 / LR.13)
- > Proteine concentration measurement, R.O. / U.F. (LR.10/LR.13)
- > R.O. / U.F prior to spray drying (LR.10/LR.13)
- > Fruit preparations (LR.10 / LR.13)



Brewery

Brew house

- °Plato (LR.10)
- > Wort cooking
- > Outlet lautertub
- > Mash filter inlet

Fermentation cellar

- °BRIX (LR.10)
- > Sugar dissolver, liquid sugar adding ("brew house expansion") (LR.11)
- > Online extract control for fermentation control (LR.10)
- > Extract measurement yeast for propagation control (LR.10)

Filter cellar

- °Plato / Org. Grav + Alcohol + CO₂
- > HGB Blending, carbonation (LR.10 / LR.10 + DM.30 / CO.20)

Filling

- °Plato / Org. Grav + Alcohol + CO₂
- > Product end monitoring (LR.10 / LR.10 + DM.30 / CO.20 / OX.40)

Beer mixture products (Cola beer, Shandy etc.)

- °Plato / Org. Grav. + Alcohol + CO₂ + O₂
- > Mixture monitoring (°BRIX + CO₂, LR.10 + CO.20)



Wineries

Grape pick up

- °BRIX (LR.10)
- > Grape pick-up / "sugar stand" / station

Filling

- Residue sugar, Alcohol
- > End product monitoring (LR.10 + DM.30)



Cava / Cidermakers

Fruit pick up

- °BRIX
- > Fruit pick up station + phases separation at separator (LR.10)
- > Sugar dissolver, liquid sugar adding (LR.13 / LR.14)

Filter cellar

- Alcohol + CO₂
- > Blending, carbonation (LR.10 + DM.30, CO.20)

Filling

- Alcohol + CO₂
- > Product end monitoring (LR.10 + DM.30, CO.20)

ACM Instrumentation applications by industries

Special applications ...



Distilleries / Liquor makers

Destillation Alcohol (LR.10, but ATEX missing)

- > Feed control
- > Diluting monitoring
- > Filling

Alcohol and added fruit / sugar

- °BRIX
- > mixing monitoring (LR.10)



Liquid egg applications

BRIX=Dry mass content (LR.13)

- > Separation of white and yellow egg before / after flash pasteurizer
- > Mixing control
- > Filling monitoring
- > Feed control prior to spray drying



Chemical industries / pharmaceutical industries / others; ref. Index

- > Urea dilution (LR.13)
- > Glycol conc. control (de-icing control for planes)
- > Dryness of organic oils (condensator makers)
- > Conc. control for liquid preservatives; natrium sorbate + kalium benzoate; big soft drink makers
- > Concrete additives dissolver (LR.13)
- > Citric acid dissolver (LR.13)
- > Tea extract making (LR.10, LR.13)

Sensor technology

LASERREFRACTOMETER

LR. 1X

The inline measuring device developed by ACM measures per second (!) the actual °BRIX value of the beverage and calculates that way very precisely the refractive index and the refractive number. The difference to conventional refractometers is, that due to a special construction of the used prism the laser beams enter in the prism and the reflecting rays exit the prism.

A CCD camera records this and determines in linear function the °BRIX value with enormous accuracy, as it is usually only possible with specially calibrated measuring instruments under laboratory conditions. This protected optical measurement method includes at the entrance and exit areas a special coating, to prevent the formation of deposits due to temperature fluctuations. This coating holds the Laserrefractometer completely free of condensation water at very low temperatures. In addition large temperature fluctuations such as when changing from cleaning process (CIP) with over 90° suddenly to rinsing water at approx. 15 °C and later to product with approx. -1 °C, are irrelevant.

The measuring system is ready to measure at any time in any process state, maintenance-free and drift-free. During the development of the Laserrefractometer consideration was also given to the fact that colour, turbidity, solids and bubbles have no influence on the measurement result. Every single beam of light is not only being recognized as light/dark by the new designed CCD camera but also the reflected light intensity per pixel. The electronic system developed by ACM recognizes this information and evaluates an overall picture in form of a 3-dimensional image in a memory module.

There, the laser current is precisely regulated, so that we never have to calibrate or adjust it again after changing the products. The Laserrefractometer is worldwide unique with this mechanism and is therefore not subject to any deviations for different products.



LASERREFRACTOMETER LR. 10



The Laserrefractometer LR.10 is operational for all beverages in the area 0 to 30° BRIX. Especially for light and diet beverages, the LR.10 enables to get an exact recording of the concentration. More and more soft drinks are added with sweeteners whereby the sugar percentage is really low (reduced beverages) or not even necessary anymore (light drinks). Sweeteners are chemical compounds beyond the range of carbohydrates showing a much higher sweetener intensity, but without or with a very low nutritive value.

Following sweeteners are currently used: Acesulam, Aspartame, Cyclamate Saccharin, Neopesperidin, Thaumatin etc.... Compared to sugar, their sweetener effect is 30 to 3000 times higher. That's why we cannot measure the sweetener with conventional measuring systems for BRIX and density. Only the use of a Laserrefractometer with selective wavelengths enables us to have an effective measuring method. Normally we produce final syrups in the syrup and store them in tanks. At this point we can measure 1 to 6 °BRIX, depending on the product (type of the bases and the essences). Common Cola products have a value with about 1,8 °BRIX.

That is why we already recommend at this stage to place a Laserrefractometer for quality control of the final syrup. Thence, the syrup gets to a mixing device and is usually mixed with water and CO₂ to become a final syrup (typical mixing proportions are 1:5,60). As the Laserrefractometer determines continuously the BRIX value independent from the CO₂ content, we can measure directly in mBRIX value (1 °BRIX = 1000 °mBRIX). Due to differing measuring and evaluation methods in the laboratory and quality management, some leading bottlers introduced the %-value or TA-value for the quality assessment of light drinks.

Technical Data

Dimensions: W205×H360×D170 mm, **Weight:** Approx. 8,3 kg, **Mounting:** Inline Varivent; bypass; G 100 tank flange mounting, **Power supply:** 24 VDC; 0,9 A, **Max. nominal pressure:** 10 bar, **Cleaning:** Common CIP, up to 130 °C, **Measuring ranges:** LR.10: 0–30 °BRIX, for lemonades and diet drinks, fruit and vegetable juice, etc. LR.11: 40–85 °BRIX, for ready made syrup, liquid sugar, concentrates, etc. LR.13: 0–78 °BRIX for ready made syrup incl. diet, concentrates and special applications, **Output signal:** RS 485-Industriebus, (0)4–20mA, Profibus DP and DeviceNET, Profi-Net

LASERREFRACTOMETER LR. 13



The ACM Laserrefractometer LR.13 is used for continuous, fast and highly accurate determination of the BRIX values in juices, lemonades and diet drinks and for CO₂ independent determination of original gravity from brewhouse to bottling. Thanks to the LR.13 we can reach an accuracy of +/- 0.002 °BRIX (resolution 0.001 °BRIX), that value is so far unequalled. That way we can obtain a very accurate measurement especially for syrup and dissolved sugar (liquid sugar). Therefore, the LR.13 is especially used for syrup and sugar dissolving and everywhere, where we have to measure, regulate and supervise very exactly and quickly from 0 to 80 °BRIX. The usual problems when using conventional process refractometers caused by internal condensate formation according to CIP are so sorted out. The laser refractometer is robust and maintenance-free.

LASERREFRACTOMETER LR. 14 PS



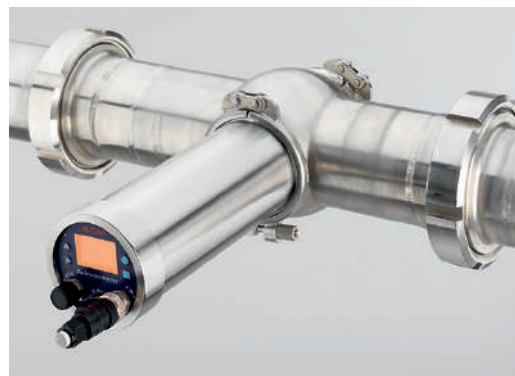
LR.14 PS is optically and electronically based on the ACM Laserrefractometer LR.1x, worldwide spread in brewery, beverage, juice and concentrate making industries. It was developed for applications where quick reactions to changes of the measured parameter are needed but not the highest possible accuracy is required e.g. for separation of water and beverage/beer phases at push-out prior to filler start or flavor change. One fresh °BRIX value each second gives the possibility to reduce expenses.

LR.14 PS is also applied on simple dissolver stations, in the brew house for °PLATO determination during wort cooking/ at lauter tub outlet, and generally in food and waste water applications. Because of its very compact design LR.14 PS is usable for classic monitoring tasks under strained constricted conditions.

Technical Data

Dimensions: W 205 × H 375 × D 180 mm, **Weight:** 5,9 kg, **Mounting:** Varivent inline, **Power supply:** 24 VDC; 0,3 A, **Max. nominal pressure:** 10 bar, **Cleaning:** Common CIP, up to 130 °C, **Measuring range & accuracies:** 0–75 °BRIX; +/- 0,1 °BRIX, **Data display:** LCD Graphic display with back-ground lighting 4 lines per 12 digits LED indicator for 4–20 mA loop open or closed, **Output signal:** 4–20 mA incl. System cable for signal outlet and power supply.

LASERREFRACTOMETER LR.15 / 16 TF



The Laserrefractometer ACM LR.1x - worldwide known as high accurate Inline °BRIX / O.G. meter in the beverage and beer sector - is now available in a new version for tank flange mounting.

LR.15 / 16 TF serves for the monitoring of mixing processing in stirred tanks, for end product quality monitoring prior packing, or the surveillance of all in several process steps involved vessels and tanks. The combination of newly developed optical assembly and electronics lead to the extreme compact cylindrical design. By the help of the ACM tank flange adapter the LR is intruding deeper into the tank which enables optimum flow conditions during mixing process a highly accurate concentration determination is now possible!

LR.15 / 16 TF is also applicable for classic monitoring tasks under constricted conditions.

Technical Data

Dimensions: W 210 × H 81 mm, **Weight:** 2,1 kg, **Mounting:** via ACM tank flange adapter or Inline Varivent, **Power supply:** 24 VDC; 0,3 A, **Max. nominal pressure:** 10 bar, **Cleaning:** Common CIP, up to 130 °C, **Measuring ranges, accuracies & resolutions:** LR.15: 0–30 °BRIX; +/- 0,01 °BRIX; +/- 0,005 °BRIX, LR.16: 0–75 °BRIX; +/- 0,02 °BRIX; +/- 0,01 °BRIX, **Temperature working range:** 0–50 °C, **Data display:** Grafic display amber with back-ground lighting 102×64 Pixel, **Output signal:** RS 485, 4–20 mA, Profibus DP and DeviceNet



CO₂- MEASURING UNIT CO.20



For the uninterrupted measurement in beverages

The CO₂ measuring unit serves the Inline / Online CO₂ measurement in the brewery and beverage industry. The measuring principle is based on the ACM continuous partial pressure method; membrane system.

The space behind a CO₂-permeable silicone membrane, fixed in front of the measuring chamber, is filled with diffusion CO₂ until the chamber pressure reaches the partial pressure of the dissolved CO₂ in the liquid. At de- or increasing CO₂ concentration in the liquid, the measuring chamber pressure corresponds. By using up to date microprocessor electronics, the current CO₂ value is continuously calculated from the determined pressure and temperature values and shown as the actual value in g/l or Vol.

The CO.20 is highly accurate, robust and almost maintenancefree. There are no moving parts and a continuous supply of carrier gas is not necessary. The membrane can easily be exchanged; a change once per year is recommen-

ded. ACM CO.20 is fully CIP-able. Longer production stops do not have any impact on the membrane quality. Also there is no need for a gas carrier. What is new is the integrated user interface with 5,7" graphic display. Easy handling by self-explanatory symbol keys. Unlimited number of products, free choice of limits and alarms incl. hysteresis and the recorder display support your daily work.

Technical Data

Dimensions: W 230 × H 300 × D 170 mm, Sensing head: D 85 × L 150 mm, **Weight:** about 4,6 kg (without sensing head), Sensing head: approx. 1,2 kg, **Mounting:** Inline Varivent or bypass, **Power supply:** 24V DC +/- 20%, 800 mA, **Compressed air supply:** 5 to 7 bar, standard compressed air, dry oil-free; Plug connection, diameter 8 mm, **Max. nominal pressure:** 10 bar, **Cleaning:** Common CIP, up to 130 °C, **Measuring range:** 0 to 10 Vol. resp. 0 to 20g/l, **Accuracy:** +/- 0,03 Vol. resp. +/- 0,05 g/l, **Response time t90:** < 5 sec, **Data display:** 5,7" graphic display, 320×240 px, width 115×height 85 mm, **Output signal:** RS485, (0)4–20 mA, Profibus DP and DeviceNet.

DENSITYMETER DM.30P



In the brewing and beverage industry the continuous measuring of the liquids' density plays an important part. The concentration of material and therewith the quality of the liquid to be measured are determined by the method of density measurement. The density sensor DM.30P determines continuously and highly accurately the density of liquid substance. The system bases on the measurement of the oscillation period of a U-tube activated electromagnetically.

The liquid to be measured is oscillated in the U-tube and the resonance frequency is determined. In addition the temperature dependency of the density is compensated by a very fast temperature sensor Pt-100. A micro computer system records continuously all signals and calculates the real or relative density and all resulting specifications and concentrations.

Technical Data

Dimensions: W355 × H170 × D320 mm, **Weight:** about 28 kg, **Power supply:** 24 VDC; max. 20 W, **Max. nominal pressure:** 10 bar, **Cleaning:** common CIP, up to 130 °C, **Measuring range:** 0 - 3 g/cm³, **Repeatability:** 1 × 10⁻⁵ g/cm³, **Output signal:** 4-20 mA, Profibus DP, **Data display:** 2×16 digits LCD with background lighting, **Mounting:** low-vibration, wall mounting or base frame, **Protection class:** IP65

INLINE O₂-METER OX.40 OXYSENSO



ACM OX.40 OXYSENSO is based on a further development of the opto-chemical measuring principle. Now precision optics enable a more accurate detection of afterglow time and resp. of phases shift, resulting in higher resolution and lower O₂-detection levels. By using extremely robust sensor tip material outstanding long run time together with fast response times are achieved. The patented application of a reference LED makes the sensor almost drift-free.

Further Innovation

By changing of the sensor tip factory calibration of tip is transmitted Offline calibration or calibration via hand held devices are not needed anymore, making so the maintenance task by far easier.

Technical specifications

Dimensions: W210 × H210 × D166 mm, **Weight:** 4,6 kg, **Mounting:** Varivent Inlinemounting, **Power supply:** 24 VDC; 0,4 A, **Nominal Max pressure:** 10 bar, **Cleaning:** Plant typical CIP, until 130 °C, **Measuring range:** 0 - 10 mg/l O₂, **Accuracy:** 0 - 2 mg/l O₂, +/- 0,005 mg/l O₂, 2 - 10 mg/l O₂, +/- 0,05 mg/l O₂, **Resolution:** +/- 0,002 mg/l O₂, **Response time:** t90 < 20 sec, **Temperature working range:** -5 to 40 °C, **Output signal:** RS485, 4-20 mA, DeviceNet, ProfibusDP and ProfiNet

PATENTED

CONDUCTUBILITY LF 50

After prior consultation the ACM system can be used for external devices. For example, for the measurement of electronic conductivity of a liquid (drink). This represents an important sum parameter in the estimation of the beverage quality. Conductivity measurement is done with an inductive sensor. A sin-wave alternating voltage feeds the transmitter coil. Depending on the conductivity of the liquid to be measured a current is induced into the receiving coil. The current is proportional to the conductivity of the medium.

The device can be delivered as a combined device (transmitter and measuring line in a device) or as a reduced version (transmitter and measuring line connected by cable). The reduced version is particularly suitable for systems with strong vibrations and/or high temperature radiation at the measuring point or for installation in hard-to-reach places.

Technical Data

Power supply: 24 VDC / 3W, **Measuring range:** 0-20 ms (modulable), **Output:** 4-20 mA, **Mounting:** varivent



TEMPERATURE SENSOR CONTACT FREE TS. 60

For the beverage industry it is more and more important to have the exact bottle temperature during the filling process. This is only possible with contactless sensors in the infrared range. The sensors we currently find on the market have an accuracy of +/-1°C (in best case +/-0.5°C) and are therefore unsuitable.

Together with Raytec we have developed a sensor, which measures exactly for this application. A measuring accuracy of +/-0.1°C. From the blow-moulding machine to the filled beverage bottle all zones regarding temperature can be monitored. These data are very important for the speed of the filling process itself, as well as for the stability of the PET bottle during the filling process.

Technical Data

Power supply: 24 VDC / 1W, **Output:** RS 485.










Compact systems - processes

MONITORSYSTEM QUATROL.50S

A continuous and efficient quality control is important for the beverage industry. Especially during the filling process, the individual soft drink parameters need to be monitored quickly, accurately and reliably.








The flexible, modular and future-save system QUATROL.50S monitors the specific quality parameters of the beverage. What makes this system outstanding is the easy operating and its high accuracy.

SOFTDRINK

-  °BRIX / % DIET
-  CO₂
-  Conductivity
-  pH
-  Colour, haze
-  Flow
-  Syrup °BRIX



BEER

-  Original gravity
-  Alcohol
-  Degree of fermentation
-  Energy content
-  °BRIX
-  CO₂, O₂
-  Conductivity, pH

The continuous measurement for determining the characteristic values for soft drink types with QUATROL.50S records the most important parameters of a drink. For easy verifying with laboratory results, all measuring values are compensated to 20 °C. The system owns a big versatile product storage, media settings for up to 200 products is possible. When a product is selected by its individual number or name, the production control process runs fully automatically.

If measuring values exceed given limits, an alarm is indicated. The connection of audio-visual alarm devices and a filler switch off is always possible. The start-up and finishing processes are monitored without problems in the manual mode. All measuring signals are stored on systems HDD. An easy connectable protocol printer brings transparency in the filling process.

For easy to handle system calibration, adjustment to laboratory values can be done during production



Simple operation is guaranteed by modern touch screen display technology.

Operation errors are excluded.

SYSTEM HANDLING

Start: Button „START“, Selection of the product number; Button „ENTER“. The system starts in the Manual-mode, no alarms are set.

AUTOMATIC

Button „AUTO“.

After startup the system is switched to surveillance mode, On case of exceeding readings alarms are given.

MANUAL

Button „MANUAL“.

Manual operation. Avoids unnecessary alarms in case of errors.

STOP

Whilst the filling process stops, the surveillance mode is halted, no alarms are caused by production stop. Production finish: Button „FINISH“. End of surveillance



Who stops getting better,
starts to be worse

Hartmut Eklöh



The QUATROL - system is equipped with all the currently required data interfaces. We always get a complete measuring system as defined by the quality control (DIN/ISO 900ff). Furthermore, ACM offers a special software for integration into a centrally regulated quality control system via computer. This software contains a data base for long-term measuring, stati-

tical and graphic analysis of product-based measuring and product data, as well as real time presentations and flow charts of the filling process. The control via PC and the integration of all data in a network are self-evident. By the data communication standards RS 485, no limits are set.

CO₂-measuring unit CO.20

The CO₂-measuring unit serves the Inline/Online CO₂ measurement in the brewery and beverage industry. The measuring principle is based on the ACM continuous partial pressure method; membrane system. The space behind a CO₂-permeable silicone membrane, fixed in the front of the measuring chamber, is filled by diffusion CO₂ until the chamber pressure reaches the partial pressure of the dissolved CO₂ in the liquid. On de- or increasing CO₂ concentration in the liquid, the measuring chamber pressure corresponds. By using up to date microprocessor electronics, the current CO₂ value is continuously calculated from the determined pressure and temperature values and shown as the actual value in Vol.



Laserrefractometer LR.10

Caused by the varying quantity of dissolved matter in the medium, a laser beam in combination with a specially coated prism is deflected. A CCD camera detects accurately the deflection, the measuring signal is transferred into °BRIX. A fast temperature sensor reads the temperature of the sample, the °BRIX value is compensated to 20 °C reference temperature. The °BRIX measurement is CO₂ independent.

Densimeter DM.30

For the measurement of density, the oscillating U-tube method is nowadays a common and recognized measuring method. The liquid to be measured is oscillated in the U-tube and the resonance frequency is determined. In addition, the temperature dependency of the density is compensated by a very fast temperature sensor.



MULTILINE SYSTEM QUATROL. 3000

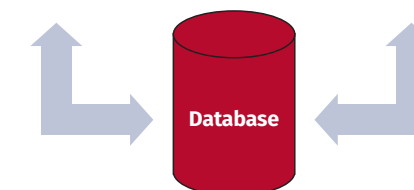
Every bottling plant consists of a variety of machines to produce and bottle fruit juices and lemonades. They are subject to various margins and interferences depending on the type and technical data. Looking at the complete production progress it must be mentioned that the quality and amount of drinks to be bottled depend on the technical condition of the bottling plant and the reliability of the staff. Raw materials, energy and workforce are very valuable nowadays.

The productivity depends therefore on economic use of raw materials and energy, and on the reliability of staff. The QUATROL concept has been developed to facilitate the accessibility to computer assisted production control for small and medium-size bottling plants. A complete, simple concept, clearly structured and easy to understand, that differentiates itself from the other products of the market. With the help of modular function groups QUATROL can be adapted to any plant and processing situation. This means that global bottlers can also get multilinear registration and control.

The complete volume of the QUATROL user programme contains several programmes depending on the size of the plant. Some of these programmes are running in the background and can't be influenced by the user. All ACM programmes have been developed in the multitasking system, that is why important programme functions (communication with the interface connections, calculations, controls, alarms, data back-ups, system surveillance) work unseen. The user is provided with masks; the selection of the page is made via function key or mouse in the well-known Windows technology.

Two basic areas must be distinguished:

BACKGROUND PROGRAMME	USER SURFACE
QKOMM communication with measurement system; status and limit surveillance	QUATROL product memory, product parameters, calibration and laboratory comparison data analysis, graphic, export group displays, linear display



QMaster							
Rendelsur S.A. Sevilla - Laboratorio							
VIDRIO 01	1	VIDRIO 02	2	LATAS 01	3	LATAS 02	4
BRUX	98.40	BRUX	0.00	BRUX	114.74	BRUX	98.76
CO2	3.64	CO2	0.56	CO2	0.00	CO2	3.64
UV	97.77	UV	0.00	UV	107.27	UV	0.00
PET 01	5	PET 02	6	PET 03	7	Asaplica	8
BRUX	12.61	BRUX	0.20	BRUX	10.39	BRUX	0.00
CO2	0.69	CO2	0.74	CO2	4.17	CO2	0.00
UV	0.00	UV	98.90	UV	96.69	UV	0.00





MULTILINE SYSTEM QUATROL. 50B

The continuous Online measurement Quatrol 50.B determines following parameters:

- The refraction number
- The density of the liquid
- The CO₂ value.

Based on these readings a complete mathematical beer analysis according to MEBAK / Balling is carried out. The following values are determined:

- Alcohol in %vol and g/l,
 - Original gravity direct and calculated,
 - Extract apparent and real,
 - Degree of fermentation,
 - Energy content in cal and kj.
- For easy reading verifying to laboratory results, measuring values are compensated to 20 °C.

Determination of original gravity according to the Laser principle

The refraction index (BRIX value) is highly accurately measured by the combination of a laser beam and a special prism, including unique signal evaluation electronics and algorithm. A CCD camera detects a deflection caused by concentration. The deflection is transformed into a proportional measuring signal.



A temperature sensor measures the beverage temperature and compensates the BRIX-reading to 20 °C reference temperature. All measuring signals are recorded, calculated and stored by a micro computer system. Density is continuously measured at an accuracy of +/- 0,0001 g/cm³. The optional CO₂ measurement is carried out via the real Inline continuous analyser CO.20. No moving parts, robust and highly accurate, +/- 0,02 Vol.

QUATROL.50B user terminal features:

The system owns a big versatile product storage. Media settings with up to 200 products are possible. When a product is selected by its individual number or name, the production control process runs fully automatically. If measuring values exceed given limits, an alarm is given. The connection of audio-visual alarm devices and a filler switch-off is always possible. The start-up and finishing process are monitored without problems in the Manual-mode. A protocol printer brings transparency in the filling process. For easy-to-handle system calibration, an adjustment to laboratory values can be done during production.

QUATROL.50B is an open and modular system, growing with customers demand. CO₂, O₂, conductivity, turbidity and pH sensors can be connected and their readings monitored. The QUATROL.50B system provides with all up-to-date interfaces, to be integrated into existing PC networks or PLC systems.



REMOTE DISPLAYS EXDIS

For the displaying of measuring data (°BRIX, CO₂, cond. etc...) in filling areas big displays are needed. ACM remote display design allows the use in the rough conditions of beverage industry (IP64).

Several displays can be arranged to form an information centre. The displays are usually placed near the filler or in the laboratory, in order to surveil process data.

ACM DIS.10: For displaying inline-relevant information and events in relation to ACM QUATROL systems or for individual readings. Data communication by RS485 interface. Latest blue mode technology, 5,7" active display size, in PVC housing, protection class IP64.

ACM DIS.30: For visualizing of individual line readings in large-size. Direct RS485 communication with all ACM QUATROL systems, and NEW: incl. 4 - 20 mA inlet! Input scaling and dimensions are freely settable. Covers all display purposes in production process, if a 4-20mA signal is available. Active display size 290x70 mm, in PVC housing, protection class IP64

ACM DIS.50: External display in new bright VFD technology, extra large display size 470x53 mm, in SS housing, protection class IP 64. All important line information are displayed. Direct RS485 data communication with all ACM QUATROL systems.



Operation terminals

TERM.100 DISPLAY UNIT

- ➔ Economy display and calibration unit
- ➔ Various limits and alarms incl. hysteresis freely selectable
- ➔ Dimensions: 29,8×25×8,9 cm
- ➔ Up to 5 ACM or other measurement units connectable
- ➔ 5,7" graphic display with recording demonstration
- ➔ Self-explanatory operation by symbol buttons
- ➔ Unlimited number of products to be set up
- ➔ Alarm and 4-20 mA outputs on demand
- ➔ Control optional by Profibus DP, DeviceNet or Ethernet TCP/IP



Standard firmware versions

„S“ Soft drink and juice application, incl. %diet scaling

„B“ Brewery application, incl. original wort due to MEBAK

TERMINAL TERM.200

In the area of quality management for beverages a central operating unit is essential for the reading of important data. All signals from the sensors are captured, shown on a display and regularly updated. Product specific BRIX, CO₂ and conductivity values, as well as additional data like pH, oxygen are captured and analysed.

The ACM concept flexibly adapts to any given task, no matter if fruit or vegetable juices, soft drinks, syrup, liquid sugar, beer or any other concentrations have to be analysed. This is made possible by a product memory that stores data like nominal, limit value, corrected value, compensation data for all products to be analysed. The required product can be called up by the product number. Via standard printer all results could be printed out so that the filling process can be comprehended at a later time.



Handling

Via dialogue on the display all data are entered and all functions can easily be called up. Operating errors can practically be excluded. The terminal is equipped with all the currently required data interfaces. Together with connected sensors it forms a complete measuring system conforming to the ISO 900x quality requirements.

ACM goes a step further and offers a special software for integration into a centrally regulated quality control system via computer. This software contains a data base for long-term measuring, statistical and graphic analysis of productbased measuring and product data, as well as realtime presentations and flow charts of the filling process.

Overview

- ➔ Maintenance-free inline measuring technology in connection with QUATROL;
- ➔ 50 results in a compact, expandable concept in accordance with ISO900x;
- ➔ Quick and simple operation, errors can be excluded;
- ➔ Water-proof touchscreen;
- ➔ Generous product memory, to be dialled via function keys;
- ➔ Fully automatic supervision of the beverages, alarm system and switch-off option of the filling process
- ➔ Hardware technology made of Niro IP 67; power supply 24 VDC or 230 VAC.

QVIEW

The data stored in the file-oriented database is evaluated with the **QVIEW** program from **ACM**.

With the **QVIEW** the guidelines are defined in accordance with **ISO900ff**. Data and records can be used directly in the **QS audit**.

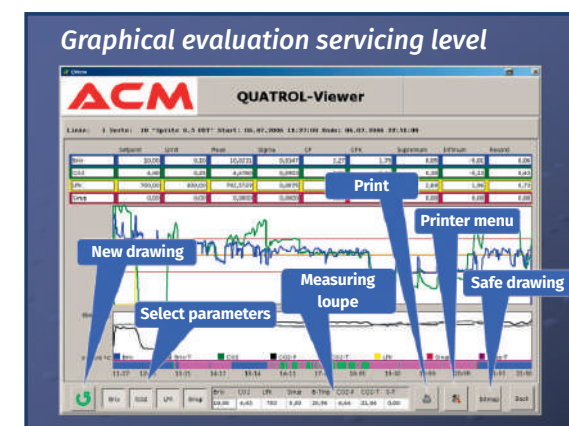
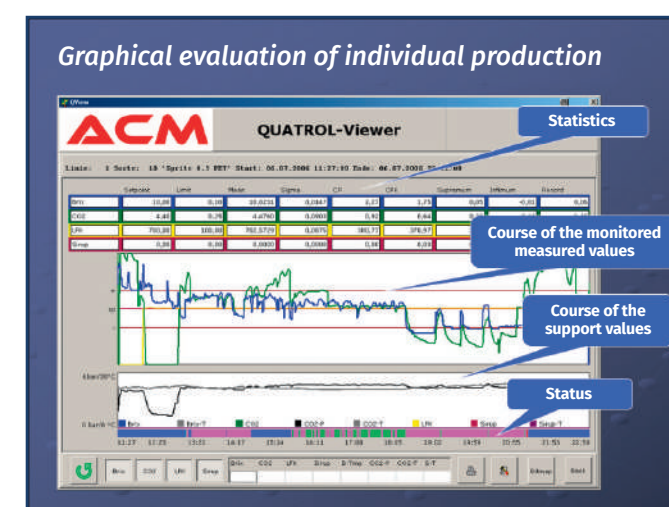
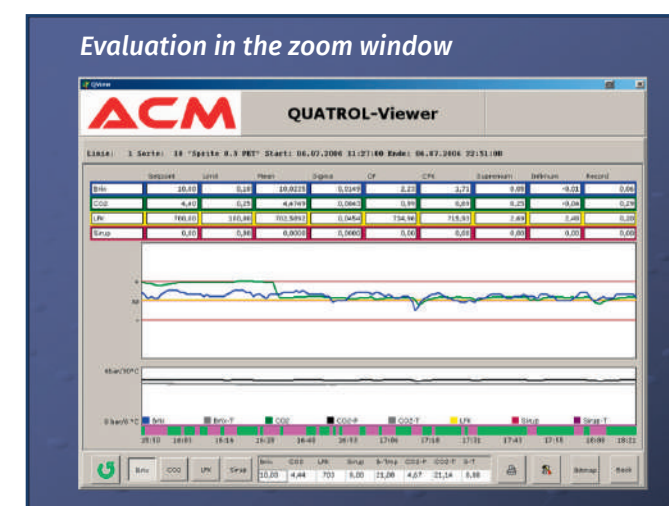
The QVIEW program delivers all saved production data as visible results from the file-oriented database, in which this data can be used for different Evaluations:

a) A completed production is displayed in graphical form (similar to writing graphics) in form of an XV characteristic. In this graphic, the setpoint (with BRIX, this can vary per production=tank change and/or inversion), as well as the limit values in relative form are visible to each other. A time axis communicates the progress during production. Several productions can also be recorded simultaneously.

b) In addition to the graphics, a customary today comprehensive statistical evaluation is possible. This shows in addition to the product data, the calculations for CP, CPK, standard deviation, calculation of mean value and fluctuation range and the complete Gaussian Evaluation.

c) An extensive logging system records all state changes during production and displays it in the form of an event log.

d) In the event of a problem, the production data (measured values) list can be used to prove when large deviations from measured values for presentation to third parties are required.



Non destructive measuring systems

Laboratory CO₂-meter

LAB.CO

**A new era of
dissolved CO₂
determination
has begun!**



Analysis of mineral water

PATENTED



Lemonade analysis



Detail of the suspension system

NEW SCALES IN THE LABORATORY

The most important and quantitatively dominant gas in beverages is carbon dioxide, but there is also nitrogen and oxygen present. Carbon dioxide (CO₂) influences the life period, freshness and the taste in the product and is responsible for an increased drinking stimulus. It is of secondary importance whether the gas ends up in the product by alcoholic fermentation or by impregnation into the product.

The content of carbon dioxide is an important quality feature and is subject to constant control during the production chain. The determination of the CO₂ content in beverages is always connected with opening the bottle, influencing so the beverage-specific gas atmosphere. ACM has developed the measuring device LAB.CO for the determination of the CO₂ concentration in bottled drinks.

By using a CO₂-selective laser, a non-contact and non-destructive measurement is performed. On basis of the selective evaluation of the wavelength of the laser beam the calculation of the CO₂ partial pressure and the total pressure occurs in the headspace of the

bottle (headspace method). The temperature is determined by a radiation pyrometer. Furthermore, via the difference formation from total pressure and CO₂ partial pressure we can determine the external gas component.

Laboratory measuring system for CO₂ analysis of carbonized beverages

Method

The measurement and compliance of the CO₂ content in beer as well as mineral water, soft drinks and other carbonated beverages is an important aspect of their quality monitoring and assurance. Carbon dioxide changes taste and aroma, depending on beverage type and is used as a preservative in alcoholic beverages.



ACM succeeded within the use of the latest laser technology to determine selectively the carbon dioxide directly in the bottle. The bottle can be returned to the production cycle after measurement because it is not mechanically destroyed. A laser beam is transmitted through the upper part of the bottle and detected by receiver optics. Due to the selective evaluation of the wavelength, a direct measurement of dissolved gas is possible. By using an infrared sensor, we measure the temperature so that a temperature compensated at 20° C CO₂ value is measured. This new method provides a modern, very fast and precise recording of the CO₂ value. Due to the fast measuring time of less than 1 minute in total, considerably more measuring cycles

can be carried out. Especially in long-term storage where always the same bottle is measured, thus the storage effort is extremely reduced.

The cost reduction is enormous, as well as the time saving factor.

The PET bottle type, as well as the bottle size, design, wall thickness and other differences play no role about the measuring accuracy, since the laser is exclusively adjusted to CO₂ bands.

Advantages

- ➔ Easy handle, as PET/glass bottle is only introduced in an adapter, no handling error possible;
- ➔ Very quick measuring time, less than 1 minute;
- ➔ No material destruction with this method, the bottle is given back to the production, no tapping is necessary; temperature measuring with laser technique contact-free;
- ➔ Very easy calibrating method. Inspection of original packaging for series tests, for long-term tests of the shelf life, we always measure with the same bottle;
- ➔ No influence of external gas due to selective laser technique;
- ➔ No wear costs, because no moving parts, no external gases, no seals, no shaking during the measuring, no filling of measuring chambers;
- ➔ Very easy calibration method.



Technical Data

Measuring range: 0 - 10 Vol. / 0 - 20 g / l CO₂,
Repeatability: +/- 0,01 Vol. / 0,02 g / l, **Accuracy:** +/- 0,025 Vol. / 0,05 g / l, **Measuring time:** less than 1min, **Resolution:** 0,01, **Data interface:** for ACM QUATROL-systems; all usual interfaces are possible, **Power supply:** 24 VDC, 0,9 A, **Dimensions:** D=32 cm, H=56 cm, **Weight:** 8,20 kg.

**No external air or gas supply necessary.
No mobile parts, no service or
maintenance contract necessary**



LAB CO₂ METER LAB.CO PET-KEG

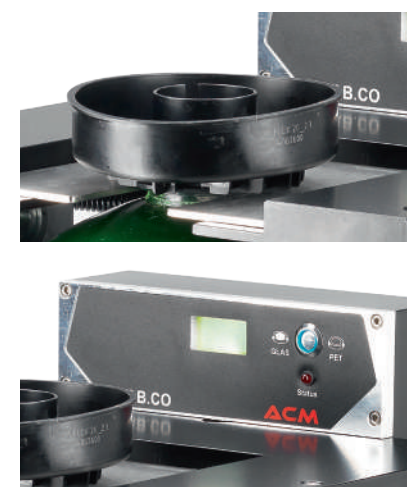
The non-destructive laboratory CO₂ meter for CO₂ determination in bottled beverages **LAB.CO** is now also available in the version **PET-KEG** for measuring of polymer KEG of 5 until 30 liter size. **LAB.CO PET-KEG** is applied for standard quality monitoring tasks during beverage filling, and for repeated measurements on same sample, e.g. for shelf-life testing.

Advantages

- ➔ CO₂ selective measurement
- ➔ Easy and safe handling
- ➔ No mechanical wear-off parts, maintenance-free
- ➔ Loss-free sample treatment!

Technical specifications

Measuring range: 0 - 10 g/l
Accuracy: +/- 0,05 g/l
Repeatability: +/- 0,02 g/l
Measuring result: within 1 minute
Data interface: to ACM QUATROL



**SAMPLE LOSS-FREE AND HIGH
PRECISE CO₂ DETERMINATION
NOW ALSO FOR BOTTLERS
IN PET-KEG!**

LAB.N2 MEASURING INSTRUMENT

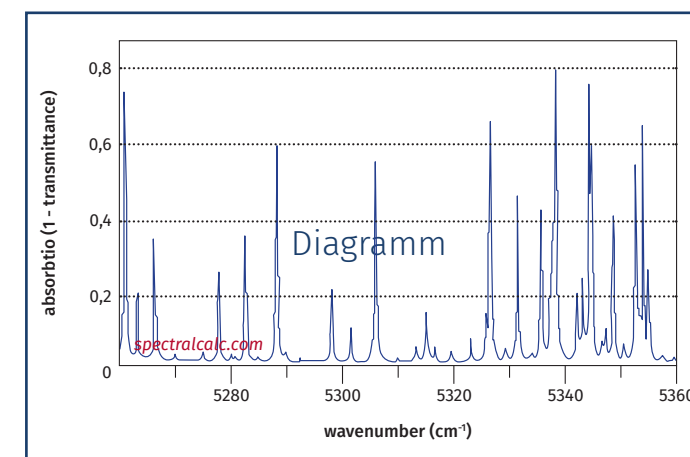
The newly patented non-invasive method for measuring nitrogen in a closed PET bottle

Currently nitrogen is used when non-carbonated beverages are filled into PET or glass bottles. This process, called inertization, stabilizes the inert condition of the beverage within a closed container. The removal of oxygen from beverages (such as fruit juices, non-carbonated mineral water, ice tea, flavoured mineral water, etc.) extends the shelf life of the product by improving colour stability, while reducing oxidation, and minimizing the loss of aroma and vitamins. Thus, one achieves a germfree atmosphere in a sealed package.

The material strength of PET bottles is constantly being reduced, while at the same time pallets of packaged products are being stacked higher in warehouses, and shipping distances are being increased where products are expected to arrive undamaged. During the bottling process after the filling of the liquid, a dosage of liquid nitrogen is added immediately before the closure is applied. The vaporization of the nitrogen immediately after sealing creates the necessary internal pressure within the container.

The new and patented Laser technology uses spectral detection in the headspace without piercing or damaging the PET bottle

The assembly of the measuring device was influenced by the installation location within the beverage industry, positive experience in recent years, as well as process observation, analysis and experience. The development of the measuring device was the result of years of experience in the beverage industry where process observation and analysis played a significant role. We began with the capabilities of the bottling employees and the requirement for a quick, simple and accurate measuring procedure. A filled and sealed PET bottle is taken from the bottling line and "hung" in the LAB.N2 measuring device. After only a few seconds a digital panel shows a valid measurement, which



Representation of wavelengths for Measurement of N_2 content after the P-expanded process of ACM

due to the required internal measuring procedure can be confirmed in 8 to 10 seconds. This one can as often as one wishes select bottles from the production line, measure for results and accomplish all of this within 10 seconds! Operator errors are eliminated thus reducing the number of employees assigned to the bottling line. Now it is also possible to measure the same bottle multiple times in succession to prove the consistent reliability of measured results. As the beverage bottle will not be pierced it is also necessary that the temperature is being measured without infringing the bottle. An ACM proprietary infrared pyrometer determines the external temperature of the bottle and through a compensation model compares the ambient air temperature and calculates the temperature of the bottle's contents. A thorough study between the temperatures of 0 and 30 °C and various bottle materials warranted an accuracy of $\pm 0,1$ °C.

This temperature value is used to determine a P20 compensation calculation of the nitrogen pressure. A positioning mechanism ensures that the temperature sensor is not optically obstructed through paper or other labels. The next illustration shows a measurement procedure to determine the internal and detectable external temperature. This evaluation was conducted by an independent testing laboratory through a most thorough inspection. The base LAB.N2 device uses the most modern electronic data interfaces and is TCP/IP compliant. Thus a direct connection to ones PC is assured. Additional modules accommodate the transfer of data to iPads, cellphones, etc. A built-in data display shows the results and all data in a clearly visible in an easy to read format. The complete measuring device operates from an independent power source or from a PC. Due to the simplicity and quick testing results the employees running the bottling line can measure more often for higher quality control. Measurements over an extended time period are simple to execute requiring only a small number of filled bottles reserved for quality control. One measures the same bottles to determine the residual



pressure within the 6 month warranty period. Using the P-20 pressure analysis one can measure the same bottles at different times and at different temperatures to determine the change in bottle pressure (gas law). By adjusting the measured result to a standardized reading for 20 °C, one has comparable values to determine the rate of pressure loss due to permeation through the PET material. Also the aging processes due to varying temperatures in warehouses and other storage areas are quick and easy to identify.



SIGNALING TECHNIQUE

The measured values recorded by the ACM sensors are transferred to higher-level evaluation systems via RS485 standard industrial bus systems. To ensure the application in the control and tax area, these data must be adapted to international, standardized data interfaces to meet

the demanding standards. With the rapidly increasing digitalization and networking of automation systems, the importance of interface systems is growing. The new generation of Interface modules from ACM guarantees the next step into the Industry 4.0 world.



ANALOGUE-Module PCS

The analogue module PCS is used for the output and conversion of a digital into an analogue module from the measuring devices. The module is connected as a "display" and is a communication receiver. The PCS receives every second the actual measured value.

Technical data: Phoenix case system for switch cabinet installation. Power supply 24VDC/80mA, measuring range 0 to 50°C, protection class IP20. Signal output 4 – 20 mA scalable. Burden max 560 Ohm. Serial input RS485 standard protocol.



PROFIBUS-Module PBI

When a measuring system is connected to a SPS, we nowadays worldwide use the communication system PROFIBUS or similar. This communication principle allows many participants to transfer information with high transmission reliability. ACM delivers the complete programming library for the most current SPS-types.

Technical data: normed M12-connection, addressable, scheduling, LED status display.



PROFINET-Module PNET

More and more data transmissions in industrial processes happen via new communication technique PROFINET and is Realtime-Internet-able. It integrates Industrial-Ethernet standards. The concept is built in a modular way. ACM also delivers the complete program modules in form of a library.

Technical data: normed M12 connection, addressable via participant names, Scheduling, LED status display.



RS-Module LIS

The LIS module is used for listening to ACM-RS485 communications, as well as for foreign communication transfers. The data recorded on the listener interface Protocols are transmitted via the Inquirer interface to a host computer in accordance with the ACM communication regulations. A protocol conversion enables the evaluation of information within a communication string. With this module non-ACM devices can be connected to our system and the measured data can be integrated into the QUATROL program.



DENSITY – Module RFC

This special module controls frequency-dependent measuring devices such as the oscillating U-tube sensors. The frequency of a U-tube is determined, the animation is taken over and the density is calculated. Due to extensive experience, this module provides a significant increase in accuracy with regard to determination of measured values and in the area of temperature compensation.

ACM in the future

The measuring technique has already covered a long distance since its beginning.

It has been further developed in the last 25 years with the introduction of the laser technique in the range of optical measuring methods. That is why we act on the assumption that this field is going to get developed even more in the future. Especially concerning the contact free measuring technique, we see new possibilities and fields of applications.

The examination is moving more and more from the laboratory to the production area.

This conversion will improve mobility, the simplicity and flexibility of the devices. In addition, in near future, measurements and measurement sequences will be done without human intervention and integrated into the production process. We at ACM support this development and are already researching into sensors for detecting further parameters contact free.



ACM is not looking for employees, but for pioneers.

Teamwork is the result of cohesion. And cohesion requires trust

Whether within the team or in cooperation with our partners and customers. We want motivated people and people who take pleasure in working and in going new ways with us. People with the right competencies and the corresponding spirit!

Not always alone makes "what can I learn" happy, it is the daily challenge in measurement technology, that formed the ACM team and the pioneering spirit.



WORLDWIDE AT HOME: WHEN THE WAYS ARE LONG ...

ACM is at home in Austria/Vienna - but you can find us in the liquid food industry all around the globe.

Our measuring systems are highly regarded, everywhere where quality, accuracy, reliability and functionality are in the foreground. This worldwide success is due to not least the international network with our partners, who always work together with ACM, and strive for highly efficient customer solutions. The core markets of Central Europe such as Austria and Germany have its own ACM sales network, and in other countries we can rely on cooperation

with the partners located there. The customer satisfaction with all our products is our top priority goal, which is why we are working with commitment to offer to our contacts, customers, suppliers and international colleagues perfect services. For questions about our products, price information and orders please contact our sales partners. The comprehensive know-how in the production of beverages make ACM to an internationally sought-after partner.

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Other sales partner



Vienna...

used to be and still is a city of research. Many revolutionary inventions have changed the world and the social lifestyle from here. What's more, Vienna is the biggest university city in the German-speaking countries. 9 Universities, 5 technical colleges and more than 1500 research institutions shape the scientific life in Vienna. Living here also means living in a city that is regularly rated as having the best quality of life and that way you will find here a creative and stimulating work environment

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Wiener Schnitzel



Vienna is the only city in the world, that gave its name to an independent dish-style, the Viennese cuisine.

Since the 18th century the recipe of the Wiener Schnitzel is in the Viennese cookbooks. Today the Wiener Schnitzel is the Austrian national dish known all over the world and always a pleasure! According to a legend Field Marshal Radetzky took the recipe from Italy in 1857.

Preparation

Cut not too thin slices, lace them it on the borders, cover them with plastic wrap, knock on them and salt them. Prepare the ingredients to crumb the Schnitzel: Put flour on a plate, whisk the eggs with oil and the milk in a plate, and put the breadcrumbs on another one. Then flour the Schnitzel, dip it in the egg mixture and crumb it with the breadcrumbs (do not press too much). Heat the oil in a pan and cook the Schnitzel on both sides

Ingredients for 4 portions

4 veal cutlet (about 500 g), salt, flour (smooth), 2 eggs, some oil, 1 TS milk, bread crumbs, Oil

ACM

MEASURING TECHNIQUE FOR PREMIUM DRINKS

Contact form

Please send your inquiries per fax to: +43 - 786 58 660 - 20, per post or per E-Mail to: office@acm.co.at
Thank you for your interest!

ACM GmbH
Goldschlagsstraße 172
1140 Vienna
Austria

Sender

Company

Street name

Postal code / city

Country

First- and last name

Position

Telephone

E-Mail

I am interested in

Process range

- ☐ °BRIX measurement Laserrefractometer LR _____
- ☐ CO₂ measuring unit CO.20
- ☐ Densitymeter DM.30
- ☐ O₂ measuring OX.40
- ☐ Beer monitor QUATROL.50B
- ☐ Soft drink monitor QUATROL.50S
- ☐ External displays DIS
- ☐ CO₂ CARBOCONTROL
- ☐ Modernisation of old mixing and syrup installations

I would like to have

- ☐ A technical consultation
- ☐ An offer

Laboratory

- ☐ Laboratory CO₂ meter LAB.CO
- ☐ Bottle shaker LAB.SHAKE

Service

- ☐ Interest in measurement technology, Overhaul and certification service
- ☐ Please take contact for on-site service needs
- ☐ Please take out our name/ our company from your data
- ☐ The address changed, please correct it

ACM The better solution for your measuring task!



*The better solution for
your measuring task!*



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