



Our MAP solutions  
guarantee certified safety for  
your packaging process.  
Keyword: HACCP

ISO 22000 approval for food safety

## DOES YOUR PROCESS INVOLVE MODIFIED ATMOSPHERE PACKAGING (MAP)?

FRIEDRICH HILLEBRAND, REGIONAL SALES MANAGER – WITT-GASETECHNIK

# THE RIGHT MODIFIED ATMOSPHERE FOR EVERY PRODUCT

## PROTECTIVE GASES

### > OXYGEN (O<sub>2</sub>)

essentially causes food to spoil due to oxidation and forms the ideal preconditions for aerobic micro-organisms to grow. As a result, oxygen is frequently excluded from modified atmosphere packaging. In some cases – typically red meat – processing is deliberately carried out with high oxygen concentrations, in order to prevent the red colour from becoming ‚pale‘ and inhibit the growth of anaerobic organisms.

### > CARBON DIOXIDE (CO<sub>2</sub>)

is colourless, odourless and tasteless. It has an oxidation-in-hibiting and growth-inhibiting effect on most aerobic bacteria and moulds. The gas is frequently used to increase the shelf life of food. The shelf life of packaged or stored food is normally longer, the higher the CO<sub>2</sub> content. Nevertheless, many products can become sour if the dosage is too high. In addition, the gas can diffuse out of the packaging or be absorbed by the product – the packaging collapses. The use of supporting or filling gases can slow down this effect.

### > NITROGEN (N<sub>2</sub>)

is an inert gas and exhibits a high degree of purity, depending on the production. It is usually used for displacing air, especially atmospheric oxygen, in food packaging. This prevents the oxidation of food and inhibits the growth of aerobic microorganisms. It is frequently used as a supporting or filling gas, as it diffuses very slowly through plastic films and hence remains longer in the packaging.

### > CARBON MONOXIDE (CO)

is colourless, odourless and tasteless. Similar to oxygen, carbon monoxide is sometimes used to retain the red colour of, for the most part, meat. The required concentrations are very low. In some countries, including the EU, the use of carbon monoxide for modified atmospheres is nevertheless prohibited in foods.



## > MEAT AND SAUSAGE PRODUCTS

Product	O <sub>2</sub>	CO <sub>2</sub>	N <sub>2</sub>
Raw red meat	70	20–30	0–10
Raw entrails	80	20	0
Raw poultry with skin	0	30	70
Raw poultry without skin	70	20–30	0–10
Cooked meat and sausage products	0	20–30	70–80

Examples of gas mixture compositions in %

Meat and sausage products, above all raw meat, are very prone to spoiling due to microbial growth on account of their high moisture and nutrient content. No matter whether beef, pork or poultry – spoilage begins from the moment of slaughter and especially all butchering. Besides high hygiene standards and permanent cooling, modified atmospheres can significantly extend the shelf life of meat and sausage products. CO<sub>2</sub> is the most important among the protective gases. At concentrations above 20 %, CO<sub>2</sub> can considerably reduce microbial growth.

In the case of red meat, there is also the risk of oxidation of the red colour pigments. The meat will lose its red colour, becoming grey and unappetising in appearance. This oxidation is especially prominent with beef. A high oxygen content in protective gas packaging can prevent oxidation. A low carbon monoxide content (approx. 0.5 %) can also help to retain the red colour of meat. However, the use of gas is not allowed in the EU, for example.

Poultry is especially sensitive to rapid spoilage and is therefore subject to higher requirements for permanent cooling. Here too, a modified atmosphere with CO<sub>2</sub> content will extend the shelf life. A high oxygen content is also used for poultry without skin so as to retain the colour of the meat. The CO<sub>2</sub> can partly be absorbed by the foods. To prevent the packaging from collapsing, nitrogen is used as a supporting gas.

Sausage and meat products, e. g. marinated or smoked meat pieces, react very differently depending on the preparation. The longer shelf life from the start can also be influenced positively with protective gases. The CO<sub>2</sub> content should not be too high with these products, in order to prevent a sour taste.



## › FISH AND SEAFOOD PRODUCTS

Product	O <sub>2</sub>	CO <sub>2</sub>	N <sub>2</sub>
Raw low-fat fish	20–30	40–60	20–40
Raw high-fat fish	0	40	60
Shellfish and crustaceans	30	40	30
Cooked/Smoked fish	0	30–60	40–70

Examples of gas mixture compositions in %

Fish and seafood are some of the most sensitive foods. They are at risk of rapidly declining in quality and spoiling even shortly after the catch. The reason for this lies in the neutral pH value as an ideal precondition for microorganisms as well as special enzymes that negatively affect taste and odour. Fish, which is rich in fatty acids, also becomes rancid quickly.

The most important element for a longer shelf life is cooling close to 0° Celsius. Modified atmospheres with minimum 20 % CO<sub>2</sub> also retard the growth of bacteria. CO<sub>2</sub> components around 50 % are frequently used. Higher CO<sub>2</sub> concentrations can lead to undesirable side effects such as liquid loss or a sour taste.

In the case of low-fat fish and shellfish, O<sub>2</sub> is also used in the packaging. This prevents a fading or loss of the colour, while serving as a growth inhibitor for some types of bacteria at the same time.

When dealing with shellfish and crustaceans, special attention should be paid to ensuring a CO<sub>2</sub> content that is not too high. This can be discerned most clearly by a sour taste, while these products absorb CO<sub>2</sub> the most, as a result of which the packaging can collapse. Nitrogen as an inert supporting gas prevents this effect.

## › DAIRY PRODUCTS

Product	O <sub>2</sub>	CO <sub>2</sub>	N <sub>2</sub>
Hard cheese	0	30–100	0–70
Soft cheese	0	10–40	60–90
Sliced cheese	0	30–40	60–70
Cream cheese	0	100	0
Yoghurt	0	0–30	70–100
Milk powder	0	0–20	80–100

Examples of gas mixture compositions in %

Cheese is predominantly spoiled by microbial growth or rancidness. A continuous cooling chain essentially extends the shelf life of products. With hard cheese, there is a risk of mould formation upon contact with oxygen. As a result, vacuum packaging was frequently used in the past, even though these are awkward to open and can leave unattractive marks behind on the product at the same time. CO<sub>2</sub> effectively prevents mould formation, but does not otherwise affect the maturation of the cheese.

Soft cheese can quickly become rancid. This problem can also be tackled with CO<sub>2</sub> modified atmospheres. However, as soft cheese absorbs CO<sub>2</sub> to a significantly higher extent, there is a risk of the packaging collapsing. A correspondingly lower CO<sub>2</sub> content should therefore be chosen.

In the case of milk products such as yoghurt or cream, there is a risk of the products absorbing too much CO<sub>2</sub> and becoming sour. A lower CO<sub>2</sub> content should therefore be chosen.

Milk powder, above all for use in baby food, is a highly sensitive product. It is especially important to ensure that oxygen is displaced from the packaging in order to extend the shelf life. In practice, packaging is carried out in pure nitrogen with as low a residual oxygen content as possible.







## > PASTA AND READY-MADE MEALS

Product	O <sub>2</sub>	CO <sub>2</sub>	N <sub>2</sub>
Ready-made meal	0	30–60	40–70
Pasta/Pizza	0	30–60	40–70
Sandwiches	0	30	70

Examples of gas mixture compositions in %

The nature and composition of fresh pasta and, in particular, ready-made meals are very different. Above all, multi-component products such as ready-made pizzas or sandwiches contain many different foods with differing shelf lives and spoilage properties. In the majority of cases, modified atmospheres can significantly extend the shelf life without using oxygen. Mixtures of CO<sub>2</sub> and nitrogen are used here. The concentration of the gases is oriented to the content of the product. If, for example, there is a risk that large volumes of CO<sub>2</sub> will be absorbed by the product, the nitrogen content should be chosen higher to prevent the packaging from collapsing.



## > SNACKS AND NUTS

Product	O <sub>2</sub>	CO <sub>2</sub>	N <sub>2</sub>
Snacks/Crisps/Peanuts	0	0	100

Examples of gas mixture compositions in %

Snack products, for example potato crisps or peanuts, primarily involve problems associated with the fat content of the food. There is a risk of oxidation, whereby the products can quickly become rancid if the packaging is not optimal. To extend the shelf life, it is therefore important to minimise the contact with oxygen. Modified atmospheres with 100 % nitrogen are frequently used. In this way, a premature spoilage can be prevented, while these atmospheres also provide protection from mechanical damage to sensitive products, e. g. potato crisps in conventional packets.



## > WINE

Produkt	O <sub>2</sub>	CO <sub>2</sub>	N <sub>2</sub>	Ar
White wine / Rosé	0	20	80	0
White wine / Rosé	0	20	0	80
Red wine	0	0	100	0

Examples of gas mixture compositions in %

Gases or gas mixtures are often used to protect wine in the different phases of its production process and to retain the quality of the product. They are mainly used to avoid contact with oxygen and prevent microbial deterioration. The tank headspace is replaced with an inert gas or a gas mixture, for example of CO<sub>2</sub>, N<sub>2</sub> or Ar. The composition of the gases is chosen according to the type of wine.



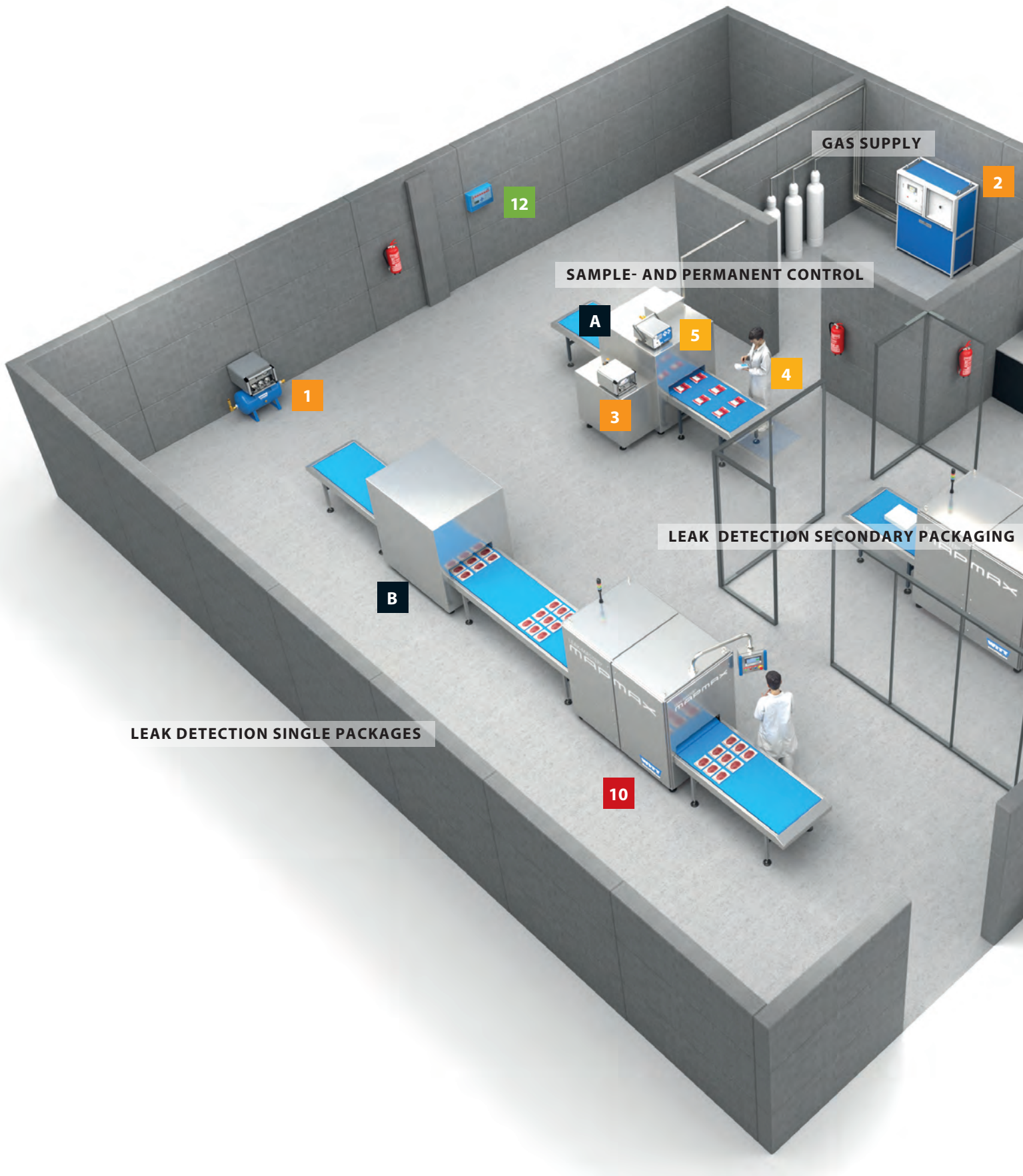
## > COFFEE

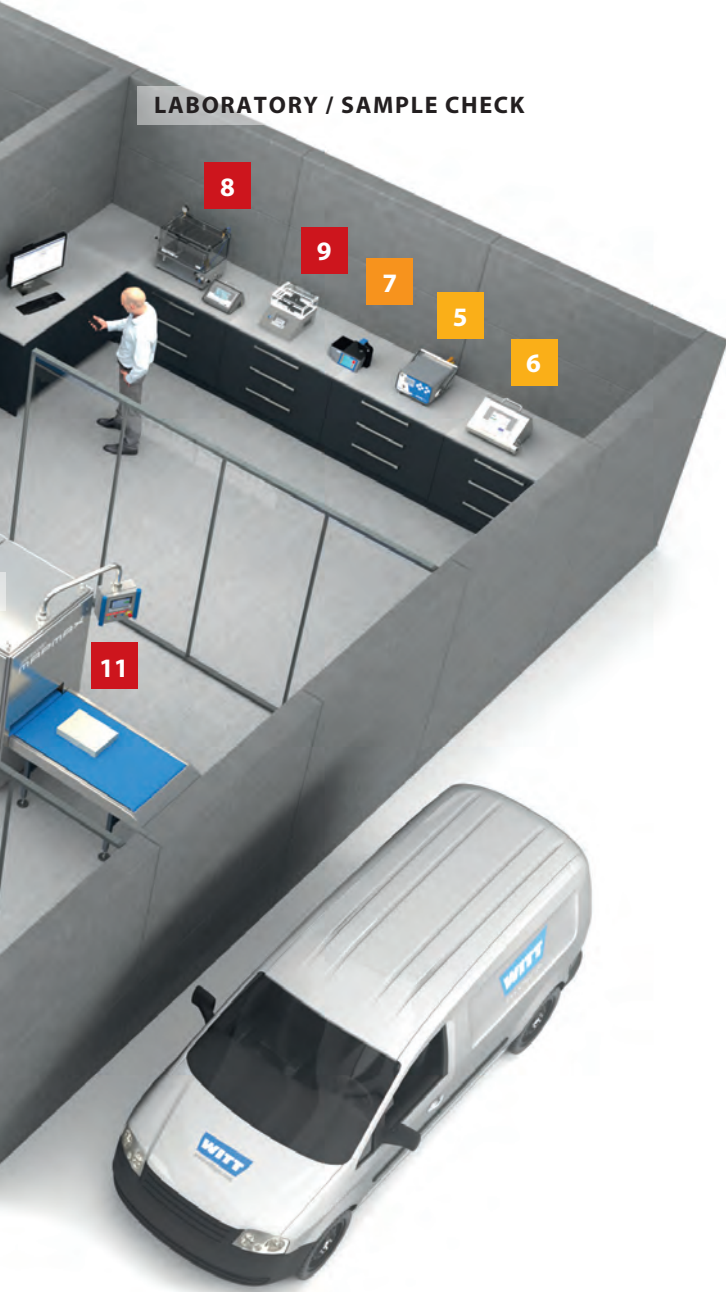
Produkt	O <sub>2</sub>	CO <sub>2</sub>	N <sub>2</sub>
Coffee	0	0	100

Examples of gas mixture compositions in %

As a dried product, coffee is relatively insensitive to spoilage by microorganisms. However, the risk of the fatty acids it contains oxidising and making the product rancid is greater. To prevent this, coffee is packaged with the exclusion of oxygen. Instead, a modified atmosphere comprising pure nitrogen is frequently used in coffee sachets or capsules.

# CONTROLLED QUALITY OFFERS PEACE OF MIND!





**LABORATORY / SAMPLE CHECK**

If you master and control your modified atmosphere packaging process you get a safe and appealing food package and protect the quality of your products. WITT gives you effective support for your quality assurance.

As a solution provider we offer high quality products for every part of the packaging process. Gas mixers, gas analysers, leak detection and ambient air monitoring – with WITT you get modern MAP solutions from a single source. Of course certified according to ISO 22000 food safety standard.

Rely on the highest level of technical standard that is available with modern MAP gas technology by WITT – for optimal process safety and perfect food quality.

The illustration of the packaging process shows where WITT products provide quality and security.

> **GAS MIXER AND GAS FLOW CONTROL SYSTEMS**

1 KM-Series

2 MG-Series

3 KD 500-1A

> **GAS ANALYSERS**

4 OXYBABY® O<sub>2</sub>/CO<sub>2</sub>

5 PA O<sub>2</sub>/CO<sub>2</sub>

6 MAPY O<sub>2</sub>/CO<sub>2</sub>

7 OXYBEAM

> **LEAK DETECTION SYSTEMS**

8 LEAK-MASTER® EASY

9 LEAK-MASTER® PRO 2

10 LEAK-MASTER® MAPMAX (*Leak detection for single packages*)

11 LEAK-MASTER® MAPMAX  
(*secondary packaging e.g. cartons E2-boxes*)

> **AMBIENT AIR MONITORING**

12 ROOM AIR MONITORING

*Please find the explanation to each product and also the corresponding technical features and benefits in the chart on the following pages.*

**A** FLOW PACK MACHINE

**B** VACUUM PACKAGING MACHINE

### GAS MIXERS AND METERERS

In the packaging process the air inside the package is replaced by a gas or a gas mixture. Today, in most of the cases gas mixers are used to create these gas mixtures. MAP gas mixers by WITT provide controlled gas quality and safety in your packaging process – for germfree and preserving food. But above all they offer high flexibility to the user. At the push of a button different mixtures can be produced in shortest time on one packaging line, depending of the requirements of the product. WITT offers gas mixing and metering systems for all packaging machines used in the food industry, no matter if vacuum packaging, thermo forming, flow pack or chamber packaging machine. The gas mixing systems are adjusted to your specific product type and processing and require only basic installation requirements.



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#### KM-SERIES

##### APPLICATION

Gas mixing systems for 2 or 3 defined gases, designed for a variety of applications, particularly for all areas with constant or varying mixed gas flow demands.

##### FEATURES → YOUR BENEFITS

- Infinitely variable mixture settings  
→ Always the correct gas mixture
- Proportional mixing valve for two gases with %-scale  
Individual mixing valves for three gases with %-scale  
→ Easy mixture adjustment without any complicated calculation
- Gas mixture withdrawal from zero to max flow capacity  
→ All-purpose for large and small packages
- Integrated pressure equalization system  
→ Protection against pressure fluctuations in the gas supply
- Splash-proof, robust stainless steel housing  
→ Easy to clean and hygienic

##### OPTIONS

- Gas supply monitoring
- Integrated analysis
- Mixer mounted on a buffer tank
- For flammable gases available as Ex-version with separate control cabinet
- Remote control



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#### MG-SERIES



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## KD 500-1A

### APPLICATION

Electronic flow control system for modified atmosphere packaging (MAP) to suit flow pack machines in the food industry and for room atmospheres e.g. for the storage of fruit and vegetables. Total control of the O<sub>2</sub> residual in the pack.

### FEATURES → YOUR BENEFITS

- Integrated O<sub>2</sub> analysis
  - Reliability by permanent control of the O<sub>2</sub> concentration
- Electronic control of gas flow to sensor
  - Optimal process reliability by self-control
- Threshold limit control with alarm relay contacts
  - Direct alarm reaction avoids defective goods (by stopping the packaging machine)
- Integrated pressure control
  - Protection against pressure fluctuations in the gas supply
- Splash-proof and robust stainless steel housing
  - Easy to clean and hygienic
- Interfaces for documentation and remote transfer of settings and measured values
  - Customer-oriented quality documentation

### OPTIONS

- GAS CONTROL CENTRE Software for data processing
- Integrated printer for data documentation
- Separate printer for data documentation
- Zirconia sensor for O<sub>2</sub> measurement

### GAS ANALYSERS

Gas analysers are essential for quality control in the MAP process. The monitoring can be done as permanent analysis directly during the packaging process or after the packaging process as sample test. For the permanent analysis a gas analyser module is integrated into the gas mixing system. The gas analyser monitors the correct composition of the gas mixture. The sample testing is part of the quality control of almost every company who is working with modified atmospheres. Via a needle a sample is taken from the package. High quality WITT gas analysers are working with modern sensors. They are very precise and fast and require a very low gas volume. By this they are suitable also for packs with very small headspace, a very low volume of gas inside the package. All data is logged and can be archived for complete documentation of the quality assurance.



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### OXYBABY® – O<sub>2</sub>/CO<sub>2</sub>

#### APPLICATION

Cordless hand held Gas Analyser for checking modified atmosphere packs (MAP). The ideal instrument for portable, faster and accurate sample tests at the packaging machine, in stores or in laboratories.

#### FEATURES → YOUR BENEFITS

- Minimum sample gas requirement (approx. 2 ml)
  - Ideal instrument for all pack sizes
- Fast measurement
  - Result after max. 6 seconds
- O<sub>2</sub> value is displayed in 0.01 % steps
  - Oxygen can be controlled maximum precisely
- Ergonomic design
  - Genuine one hand operation, plug and play
- Large illuminated graphic-text-display
  - Easy to read. All information at a glance
- Integrated needle cover
  - User protection
- Integrated data logger
  - Storage of the last 500 measurements
- Specific product names
  - Practical classification of the measured values
- Flow Control with alarm function
  - Prevention of incorrect results
- USB port
  - Comfortable connection to PC
- Multilingual menu guide
  - D, UK, F, I, NL, S, FIN, E, PL, RUS, JP, H, TR

#### OPTIONS

- Integrated barcode-reader
- Bluetooth
- OBCC Software for comfortable and safe master data management, data analysis and quality assurance
- Separate printer via Bluetooth for result documentation
- Device for headspace analysis in cans/bottles
- P version (for pressurised sample gas)



reddot design award



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## PA – O<sub>2</sub>/CO<sub>2</sub>

### APPLICATION

Compact Gas Analyser for checking and/or monitoring modified atmosphere packs/packaging (MAP). For continuous analysis (in-line) and also intermittent sampling via a needle at the packaging machine, in stores or in laboratories.

### FEATURES → YOUR BENEFITS

- Minimum sample gas requirement  
→ Ideal instrument for all pack sizes
- Threshold limit control with alarm relay contacts  
→ Direct alarm reaction avoids defective goods (by stopping the packaging machine)
- Large illuminated graphic-text-display  
→ Easy to read. All information at a glance
- Zirconia sensor for O<sub>2</sub> measurement possible  
→ Fast, precise measurement
- Integrated data logger  
→ Storage of the last 500 measurements
- Specific product names  
→ Practical classification of the measured values
- USB port  
→ Comfortable connection to PC
- Continuous analysis or sample testing  
→ Flexible usage
- Separate PC-software  
→ For documentation of the measured values
- Multilingual menu guide  
→ D, UK, F, I, NL, S, FIN, E, PL, RUS, JP, H, TR

### OPTIONS

- OBCC software for comfortable and safe master data management, data analysis and quality assurance
- Separate printer for result documentation
- Connection plugs
- Different versions available:  
continuous analysis, sample testing and P version (for pressurised sample gas)



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## MAPY – O<sub>2</sub>/CO<sub>2</sub>

### APPLICATION

Premium Multifunctional Gas Analyser for checking and/or monitoring modified atmosphere packs/packaging (MAP). For continuous analysis (in-line) and also intermittent sampling via a needle at the packaging machine, in stores or in laboratories.

### FEATURES → YOUR BENEFITS

Features see PA, plus:

- Large, clear colour touch screen  
→ Optimal information and easy to operate
- User management for up to 60 users  
→ Personalisation of measurements
- Administration of up to 1000 products  
→ Individual classification of results and limits
- Auto run of the sample hold measurement  
→ For productivity and comfort
- Data transfer via USB-stick or Ethernet connection  
→ Customer-oriented quality documentation
- Flow Control with alarm function  
→ High measuring accuracy
- Automatic checking  
→ High process safety
- Pressure compensation  
→ Reliable steady measuring results
- Electrochemical, Zirconia or Paramagnetic sensor for O<sub>2</sub>  
→ The best measuring principle to suit the application

### OPTIONS

- GAS CONTROL CENTRE Software for data processing
- Different versions available:  
continuous analysis, sample testing and P version (for pressurised sample gas)
- Barcode reader
- Fully automatic calibration
- Special version for higher inlet pressures
- As 19"-rack version

### LEAK DETECTION

Modified atmospheres can show their benefits only if the protective gas remains inside the package. The package has to be fully leak tight. Give a freshness guarantee to retailers and consumers and use package leak detection to your competitive advantage. Prevent needless returns, loss of prestige, legal consequences and, in the worst case, loss of customers by checking the leak tightness of your packages. WITT offers certified quality systems for the leak testing of all kinds of food packaging – with modified atmosphere and also with vacuum. To optimize your quality assurance you can choose between solutions for sample or in-line testing – based on CO<sub>2</sub> or a water bubble test. Witt package leak detection systems reliably detect even the smallest and convince with easy handling. Of course, you can digitally log all tests and document proven safety to your customers.



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### LEAK-MASTER® EASY

#### APPLICATION

Bubble leak detection systems for packages. The LEAK-MASTER® PRO2 enables non-destructive detection even the smallest leaks thanks to the highly sensitive, ultra-fast CO<sub>2</sub> sensor

#### FEATURES → YOUR BENEFITS

- No trace gas required in package
  - Usable without modified atmosphere (MAP)
- No electrical connections, operation using compressed air
  - Easy installation and operation
- optionally also with an electric vacuum pump
  - For operation without compressed air
- visual status display through LED lighting
  - Fast, intuitive work
- Testing of vacuum packages possible
  - One system for all kinds of packages
- Easy to use
  - No special skills required
- Low maintenance
  - Time and cost effective
- Perspex housing
  - Easy to clean

#### OPTIONS

- Different chamber sizes
- Available for vacuum packages
- Available for altitude simulation test
- Electronic control unit PLUS for easy, standardised test processes and complete documentation
- Supplementary set for testing according to ASTM F2096 (bubble test)



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**LEAK-MASTER® PRO 2**

**APPLICATION**

Leak detection system for packages containing CO<sub>2</sub>. The LEAK-MASTER® PRO 2 features non-destructive testing of the smallest of leaks at a strong price-performance ratio.

**FEATURES → YOUR BENEFITS**

- Non-destructive testing with highly sensitive and ultra-fast CO<sub>2</sub> sensor
  - Products remain undamaged and dry for further processing
  - Detects even the smallest of leaks from 10 µm (depending on the product and the test conditions)
- Visual indication of test results (LED lighting)
  - Intuitive, quick operation
- Lid with gas pressure spring
  - Quick and easy product change
- Large and clearly arranged touch screen
  - Optimal information and easy handling, no special skills required
- Compact stainless steel and acrylic glass cabinet / housing
  - Hygienic, robust and space saving
  - Double safety through simultaneous visual inspection
- Various chamber sizes
  - 2 models for single packages and small boxes
  - For larger packages, cartons or E2 boxes: LEAK-MASTER® PRO
- Data storage for over 6,000 measurements
  - For high measurement frequencies
- Data transmission via Ethernet
  - Customer orientated quality documentation, integrated into company network
- Separate PC program
  - For documentation of test results

**OPTIONS**

- Electrical vacuum pump
- Documentation software GAS CONTROL CENTER
- Barcode reader IP 65



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**LEAK-MASTER® MAPMAX**

**APPLICATION**

In-line micro-leak detection system for packages containing CO<sub>2</sub>. MAPMAX features non-destructive detection of the smallest of leaks without the need for costly helium – directly from the packaging line.

**FEATURES → YOUR BENEFITS**

*Features see LEAK-MASTER®, plus:*

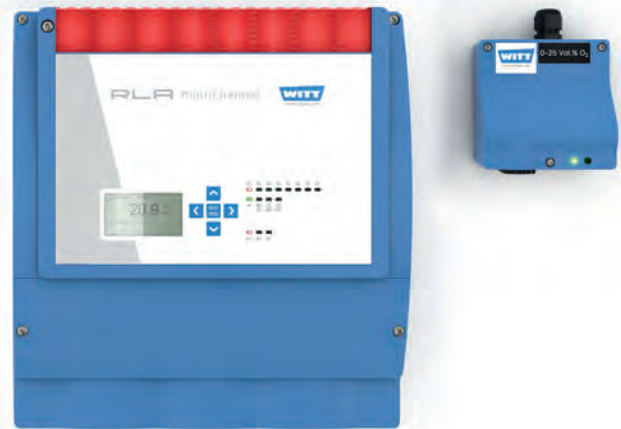
- Fully automatic leak detection
  - Avoiding operating errors
- Various chamber sizes
  - Testing of single packages, cartons or E2 boxes possible
- High operating speed (max 15 cycles/min)
  - High productivity of packaging line
- 100 % automatic control of all packages
  - No leaking packages are delivered to the customer – no costly returns

**OPTIONS**

- Various chamber sizes
- Reject system
- Documentation software GAS CONTROL CENTRE
- Barcode reader IP 65
- W-LAN (WIFI)

### 10 AMBIENT AIR MONITORING

With WITT gas monitoring systems for ambient air you protect your employees and make the use of for example carbon dioxide safer. This is not toxic but accumulates unnoticed in closed rooms and replaces the oxygen in the air. A concentration of 0.3 percent carbon dioxide in ambient air can be a health hazard. The allowed maximum concentration at the workplace is 0.5 percent. At five percent headache and dizziness may occur; eight percent and more lead to unconsciousness or even death. The gas warning unit permanently controls the concentration of the respective gas in ambient air, and activates an acoustic and visual alarm when individually definable limits are exceeded. Simply effective. For food and vegetables controlled atmospheres are not just used in packaging but for ripening control in special ripening chambers with the help of ethylene. By using gas analysers the ambient atmosphere can be monitored.



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### GAS MONITORING RLA

#### APPLICATION

Gas monitoring system for the depletion of oxygen (O<sub>2</sub>), carbon dioxide (CO<sub>2</sub>) and other gases

#### FEATURES → YOUR BENEFITS

- 3 alarm limits adjustable within the measuring range  
→ Individually adjustable alarm limits
- Triple-digit display  
→ Permanent visual control
- Connections for alarm easily accessible on front  
→ Easily accessible, for easy installation
- Continuous self monitoring  
→ High process safety
- Separate control panel and transmitter  
→ Flexible installation for highest safety
- 4 channel control panel also available  
→ Monitoring of large areas

#### OPTIONS

- Flow adapter for sensor check and calibration

## WITT – THE NO. 1 IN MAP.

WITT-Gasetechnik is a manufacturer of gas-related equipment that meets the highest quality requirements and a specialist in Modified Atmosphere Packaging (MAP). WITT was able to place the first production gas mixers for vacuum packaging machines on the market in 1977. As a world market leader WITT today offers gas mixers, meterers and analysers for all kind of packaging machines in the food industry as well as package leak detectors and ambient air monitors.

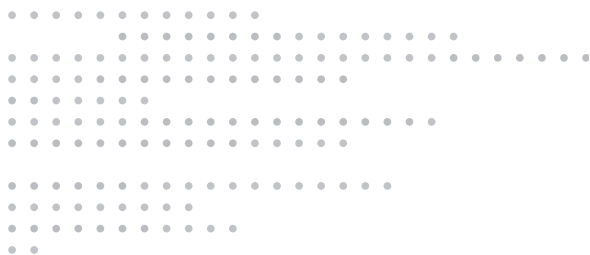
WITT products are manufactured exclusively in Germany. Through its subsidiary companies and partners, the family business now operates worldwide with approx. 200 employees. Modern production processes with a high degree of vertical integration are precondition for achieving the highest standard of products and long service life. A comprehensive quality management system guarantees the consistent achievement of the highest levels of safety and quality of everything that leaves the Witten factory. As a manufacturer, WITT is certified according to ISO 22000 for food safety.

Rely on German quality and worldwide support – rely on WITT.

## WE MEET CUSTOMER NEEDS – YOUR CUSTOMIZED MAP SOLUTION

You haven't found something suitable in our product range?  
No problem: we manufacture your custom product on demand. Step by step  
we will develop your special solution – custom-tailored to your needs.  
Talk to us about your requirements!

**Tel. +49 (0)2302 8901-0**  
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## OUR PRODUCT RANGE

### GAS CONTROL EQUIPMENT

- Gas mixing systems
- Gas metering systems
- Gas analysers
- Leak detection systems
- Gas pressure vessels
- Engineering of customised systems

### GAS SAFETY EQUIPMENT

- Flashback arrestors
- Non-return valves / check valves
- Quick couplers
- Safety relief valves
- Stainless steel devices
  - Gas filters
- Pressure regulators
- Outlet points
- Lance holders
- Ball valves
- Automatic hose reels
- Test equipment
- Accessories
- Customised safety equipment

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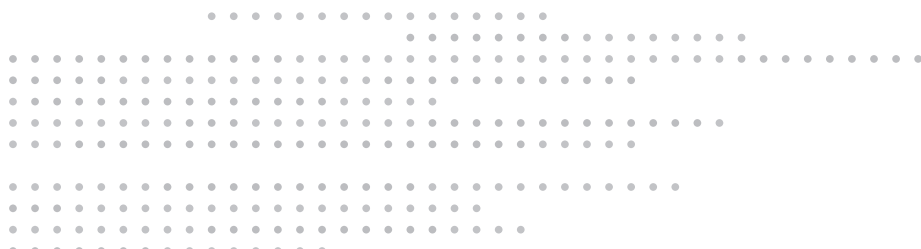
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