

Gas Mixers

**standardized,
for small to medium size outputs**



Introduction

Gas mixers are an integral part of the central gas supply of industrial plants. They operate in combination with gas sources, storage vessels, pipelines and fittings upstream, as well as with gas consuming appliances downstream. To ensure a safe and reliable supply of the required gas mixture at all times, all components of such a compound must not only fulfil the relevant EU-Rules and Regulations but must also be state-of-the-art. This applies in particular to the gas mixer.

In each individual case, design and function of the gas mixer have to be consistent both with the prevailing operating conditions within the compound and with application related performance requirements. Thus, while the unit's design is predominantly tuned to fit the type of gases to be mixed, and takes due account of volume flow, pressure and temperature, the unit's function is adapted to the output profile and to the specific requirements of the particular gas mixture application. Additional requirements specified by the user, if any, are equally noted and duly observed.

The following statements demonstrate our expertise in producing ambitiously designed gas mixers that meet challenging demands. L+T gas mixers set high technical standards based on the most updated Technical Rules for Industrial Gases and related equipment, and are a reliable tool for obtaining consistently high grade gas mixtures.

Technique

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Technique

INITIAL REMARK: Unless specifically indicated, all following data are equally applicable to both gas mixer series, BASIC and COMBI.

Design Characteristics

■ Conformity to EU rules

L+T Gas Mixers are state-of-the-art. They are designed under rigorous observance of the latest EU-Rules and Regulations, and of course in full compliance with them.*)

The BASIC Series of L+T Gas Mixers are built to PED, article 3, clause 3. For these we issue a manufacturer certificate.

The COMBI Series L+T Gas Mixers are built to PED, cat. IV. They are certified by the German association for technical inspection (TÜV). Along with it, we issue a formal Declaration of CE conformity.

■ Gas suitability

L+T Gas Mixers are suitable for mixing two or three Industrial Gases. These can be either flammable or non-flammable.**)

■ Operating temperature

L+T Gas Mixers are designed to accept a temperature of process gases ranging from -40°C to +60°C. Therefore, the additional installation of gas-preheaters is not or very rarely required.

*) See Annex 1

***) Gas mixers for multiple gas components are equally available. This requires however an individual design.



Fig.: L+T Gas Mixer, BASIC Series, for three non-flammable gases

■ Design pressure

L+T Gas Mixers are designed to PN25. In most cases such high pressure level eliminates the necessity of installing additional safety devices upstream the unit.

■ Inlet pressures

At inlet of L+T Gas Mixers, the admissible pressure level of feeding gases may range from 11,0 to 25,0 barg.*)

Also, it is by no means necessary that feeding gases are delivered to the mixer with the same pressure, since on L+T Gas Mixers every gas track, whether carrier gas or additive gas, has its own pressure regulator which allows to level any differences in gas pressure at inlet, thereby producing a common mixing pressure. These regulators are dome loaded (= pneumatically ruled), normally with carrier gas. Therefore, installing additional pressure regulators upstream the mixer's inlet, is pointless.

Even if a remarkable pressure difference between individual inlet gases prevails or if inlet pressures oscillate, L+T Gas Mixers ensure a constant and reproducible mixing ratio at all times.

■ Outlet pressure

At L+T Gas Mixers, the gas mixture outlet pressure is adjustable in the range of 2,0 and 9,0 barg.*)

At delivery, outlet pressure is pre-set to accomplish users' requirements, but thereafter, it can be modified any time by the user himself, of course within the limits allowed by the unit's design.

Modifying outlet pressure does not have any impact on the quality of the gas mixture.

*) L+T Gas Mixers can be designed to accept inlet pressure levels different from the above. This requires however an individual design.

■ **Mixing ratio of gas components**

At L+T Gas Mixers the mixing ratio of feeding gases is adjustable. This is performed through fine-tuning regulating valves.

At delivery, the mixing ratio is pre-set to accomplish user's requirements, but thereafter it can be modified any time by the user himself, of course within the limits allowed by the unit's design.

■ **Reproducibility of gas mixture**

The level of reproducibility is +/- 0,5 Vol% (from top of the range), assuming equal temperature of feeding gases at the gas Mixer's inlet.

All L+T Gas Mixers observe and maintain the pre-set mixing ratio within these narrow limits at all times, irrespective of whether

- the gas mixture extraction occurs continuously or non-continuously
- the gas mixture outlet pressure and/or the flow rate are modified.

■ **Modular structure**

One of the characteristic features of L+T Gas Mixers is their modular, flexible design. It allows to carry out re-fittings, e.g. the use of other gases, modifications on the outlet pressure or on the mixing ratio, enlarging the flow rate etc., all this in a simple and speedy manner. Such measures can be carried out on-site by the user himself.

■ **Service life**

Only well engineered equipment ensures a long service-life. L+T Gas Mixers perform with long lasting reliability and robust technique. The use of high grade components contributes not only to keeping maintenance requirements notably low, but also ensures a long lifespan. 20 years of uninterrupted operation are quite common.

Configuration (Selection)

■ Gas filters at inlet

As protection for the regulators valve seats, at L+T Gas Mixers every gas pipe, whether carrier gas or additive gas, is added an inlet filter. These filters are arranged outside the gas mixer's cabinet to ensure easy access for maintenance purposes.



Fig.: Inlet filters for feeding gases, Type GR-8500,
for L+T Gas Mixers of 15 – 100 Nm³/h



Fig.: Inlet filters for feeding gases, Type GR-8500,
for L+T Gas Mixers of 200 and 300 Nm³/h

■ **Dome loaded pressure regulators**

At L+T Gas Mixers, every feeding gas track is added a pressure regulator on its own. The pressure regulators are dome loaded (= pneumatically ruled) with carrier gas.



Fig.: Pressure regulator for feeding gases, Type LTD-1

■ **Flowmeters**

L+T Gas Mixers exhibit solely flowmeters with optical display. These are specifically selected to match the type of gas, the mixing pressure and the nominal flow rate of each individual unit. Results are displayed in Nm³/h.



Fig.: Flowmeter for additive gas



Fig.: Flowmeter for carrier gas

■ Dosing valves

L+T Gas Mixers exhibit solely dosing valves specifically selected to match the nominal flow rate of each individual unit. A satisfactory level of accuracy and comfort for dosing individual gases and producing the gas mixture required is only possible thanks to this case specific selection.



Fig.: Fine-tuning dosing valve for additive gas



Fig.: Dosing valve for carrier gas

■ **Pipes, Fittings**

At L+T Gas Mixers, all pipes are made of copper, both for process gas and for control gas. All connections are brazed or added high-grade clamping-rings in brass or in stainless steel.



Fig.: Gas pipes made of copper

■ **Integrated buffer vessels (COMBI Series)**

The COMBI Series of L+T Gas Mixers incorporate a 90-litre buffer vessel which is installed on the inside bottom of the gas mixer's cabinet in a horizontal position. The vessel is fully integrated in the system, and therefore, there is no interface to the gas mixing equipment.

To prevent damages arising from potential failures with deep-cold gas at temperatures as low as -196°C breaking-through, these buffer vessels are made of stainless steel.



Fig.: Buffer vessel of stainless steel

With an aim of facilitating regular inspections required by PED and in order to avoid any shutdown of the gas mixer, buffer vessels on L+T Gas Mixers are added a full size **bypass**. This bypass allows to remove the vessel, while the gas mixer may continue to operate without interruption.

Thanks to an integrated **blow-off pipe**, commissioning of L+T Gas Mixers can be performed even if the final user may not have ready his own installation downstream. To feed the point of use it is only necessary to turn the outlet ball valve appropriately. In other words, the availability of a blow-off pipe permits commissioning the units without prior connection to the point of use.



Fig.: Bypass for buffer vessel, blow-off pipe

In order to protect the buffer vessel from the risk of undue thermal expansion, it is added a **safety valve** which is set to a triggering pressure of 25 bar.



Fig.: Safety valve for buffer vessel

■ Integrated analyzers

The analysis of a gas mixture is performed to ensure safety and quality. Applications requiring a gas mixture to be continuously analyzed are - for example - monitoring fuel gas concentrations on thermal processes, monitoring gas mixtures in the food industry, etc. For all these applications L+T Gas Mixers are equipped with high-grade analyzers.

L+T Analyzers are laid out for continuous operation in temperatures ranging from +5 °C to +50 °C. They are suitable for use on gas mixtures of both non-flammable and flammable gases, in the latter case the analyzer is installed outside any Ex zone*). The type of measuring cell (heat conductivity, infrared, paramagnetic etc.) is selected specifically for each application.



The sample of gas mixture is taken from the buffer vessel and fed to the analyzer. Threshold values for the concentration of additive gas in the gas mixture can be set on the analyzer's panel. The analyzer monitors the gas mixture continuously and visualizes the measured concentration of additive gas on the display. It also includes several interfaces for the data transfer to external terminals, for example to connected computers.

Occurring deviations from the pre-set threshold values are displayed on the panel, and in addition, an alarm signal is generated. This signal is also transmitted via the interfaces, a fact that permits the connection to an external lamp and a signal horn. On gas mixers for flammable gases (type "GMB") the inlet pipe for additive gas is equipped with a solenoid valve which is used to block the gas flow when the upper threshold value is exceeded.

*) Analyzers suitable for Ex zones are available as well.

L+T Analyzers are installed in a small **weatherproof cabinet** with a transparent glass door, similar to the gas mixer. To ensure correct analytic results in a timely manner, the analyzer cabinet is usually positioned on top of the gas mixer's cabinet, otherwise it should be placed close to the Gas Mixer. In any case it must be installed outside any Ex zone*).

The COMBI Series of L+T Gas Mixers with incorporated analyzer are supplied completely connected and include a sample gas treatment equipment. Thus, the complete unit is ready for operation. L+T Analyzers can however also be installed at a later point of time. In these cases, they are supplied in a pre-assembled condition and need only to be connected to the gas mixer on-site.

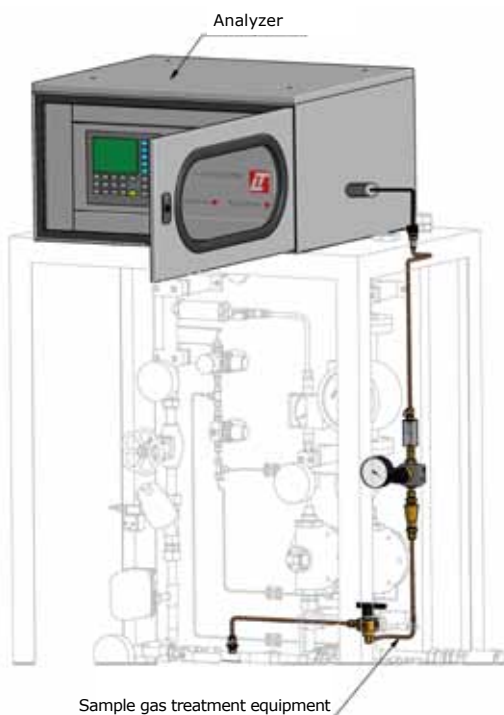


Fig.: Position of L+T Analyzer and of sample gas treatment equipment



Fig.: Weather proof housing of analyzer

*) Analyzers suitable for Ex zones are available as well.

Safety

■ Quality control

The quality assurance for L+T Gas Mixers begins already when components are selected. It continues during production and ends with final QC Inspection when the unit is to be dispatched. Ahead of being released for delivery, L+T Gas Mixers are completely assembled at factory and are thoroughly inspected for operability (function, tightness) as well as for CE-conformity.

■ Optical displays

L+T Gas Mixers allow to read-off the effective flow rates and the prevailing pressure level at all times. Every gas track possesses its own flowmeter and pressure gauge, both of them with a scale. These measuring devices visualize constantly and reliably all performance data of the gas mixer, thereby allowing to supervise quickly its function at all times. To this effect, they are generously sized and located at eye's level. The front door on the gas mixer's cabinet incorporates a window which gives sight to them.



Fig.: Pressure gauge

■ **Toughness at subzero temperature**

If ever in case of failure deep-cold gas breaks through and reaches the gas mixer, e.g. by “passing” the air evaporator, it is essential to confine and minimize damages. All metallic material used to produce L+T Gas Mixers is therefore selected to withstand safely deep temperatures of up to -196 °C. This preventive measure constitutes a valuable protection both for personnel and other equipment downstream.

■ **Full metal flowmeters**

L+T Gas Mixers are equipped only with full-metal flowmeters. These are particularly suitable for resisting both, deep temperatures and pressure peaks.

■ **Non-return valves**

L+T Gas Mixers incorporate a non-return valve to EN 730 on each gas pipe. These valves are located shortly ahead of the mixing chamber and distinguish themselves by a low pressure loss. Proper function is ensured even at lowest pressure difference, and thus, backflows are safely prevented.

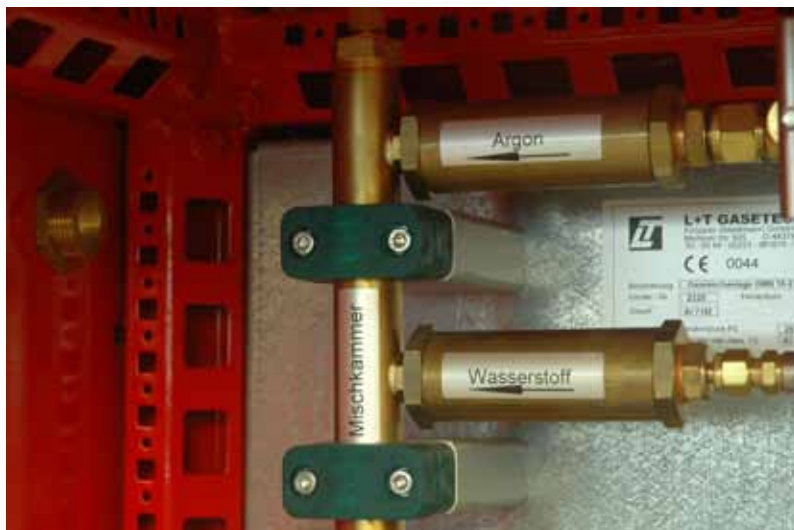


Fig.: Non-return valves

■ Tightness, Ex zone

At L+T Gas Mixers the design of pipes, fittings, and detachable connections meets the requirement "in perpetuity technically tight" according to EX-RL E1.3.2.1.*)

As an additional safety measure, gas mixers for flammable gases (type "GMB") incorporate electrical field devices of Ex-proof design, and thus, they are suitable for Ex zone 1.

(ATTENTION: This applies only to the actual gas mixing equipment! As far as L+T Analyzers are concerned please view chapter "Integrated Analyzers" (p. 17).

■ Safety features

In case of total failure of carrier gas, at L+T Gas Mixers the inadmissible enrichment of the gas mixture with additive gas is excluded. To this effect, dome loaded pressure regulators located on the gas inlet pipes are ruled by carrier gas. They are normally closed (N/C) and act, therefore, as a shut-off valve.

A carrier gas ruled pneumatic valve is installed on the gas mixture outlet pipe. It is normally closed (N/C) and acts, therefore, also as a shut-off valve. Along with the dome loaded pressure regulators on the gas inlet pipes, this arrangement forms a double safety block.



Fig.: Pneumatik valve

*) Perpetuity of technical tightness may be checked by regular leak tests.

The following measures are performed automatically:

- In case of pressure drop of carrier gas, the additive gas is adapted proportionally.
- In case of total failure of carrier gas, all gas pipes are blocked. In addition, the carrier gas ruled pneumatic valve is blocked as well.

If an analyzer is used, it monitors the entered threshold values for the concentration of additive gas in the gas mixture. Should the admissible concentration be exceeded, further gas feeding is automatically blocked at once. This is performed by a **2-2-way-solenoid valve** which is installed on the inlet pipe for additive gas. In addition, the pneumatic valve at outlet is also blocked.



Fig.: 2-2-way-solenoid valve

Function / Operation

■ Functional principle

L+T Gas Mixers feature a flow rate mixing technique based on equalized pressure of inlet gases.

■ Adjustment of flow rate

Within the max. volume flow they are designed to, L+T Gas Mixers allow to adjust the flow rate as required. This is performed through dosing and fine-tuning dosing valves at inlet of feeding gases, and along with them by a stuffing valve which is installed on the gas mixture outlet pipe. Flow rates are displayed on the flowmeters.

L+T Gas Mixers deliver reliably and continuously the flow rate required. This is implemented irrespective of the set outlet pressure.



Fig.: Stuffing valve

■ **Adjustment of mixing ratio**

At L+T Gas Mixers the mixing ratio of feeding gases is adjusted by the ratio of their individual flow rates.

First, the carrier gas volume flow required is adjusted by the pertinent dosing valve. The value is visualized on the flowmeter. The same principle is then applied to additive gas: Adjust volume flow by pertinent dosing valve and read-off on the flowmeter.

(EXAMPLE: At a 100 Nm³/h gas mixer for argon and carbon dioxide and a requested mixing ratio of 90/10, the volume flow of argon should be adjusted to 90 Nm³/h, the volume flow of carbon dioxide to 10 Nm³/h.)

At L+T Gas Mixers for flammable gases (type "GMB"), which are usually equipped with a build-in analyzer, the required rate of additive gas is adjusted by the pertaining dosing valve, while the value is visualized on the analyzer's panel.

■ **Extraction of gas mixture**

At L+T Gas Mixers, the extraction of the gas mixture may be performed, optionally, either continuously or non-continuously.

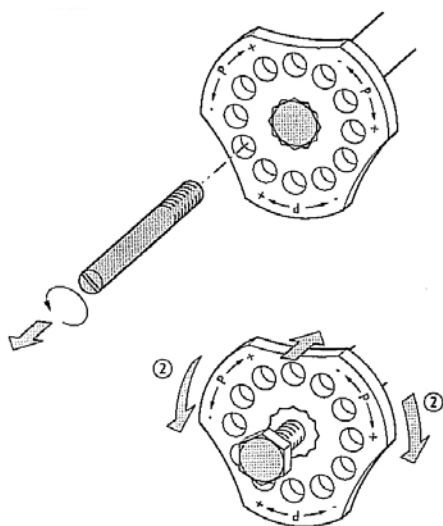
■ **Adjustment of pressure in buffer vessel**

The user extracts the gas mixture at the pressure level prevailing inside the buffer vessel. The gas mixture pressure in the buffer vessel is controlled by an adjustable, electro-pneumatically ruled pressure switch which allows entering threshold values for "switch-on" (= lower switch set point) and "shut-off" (= higher switch set point). The difference between these two points is called "hysteresis". Values are visualized on a pressure gauge.

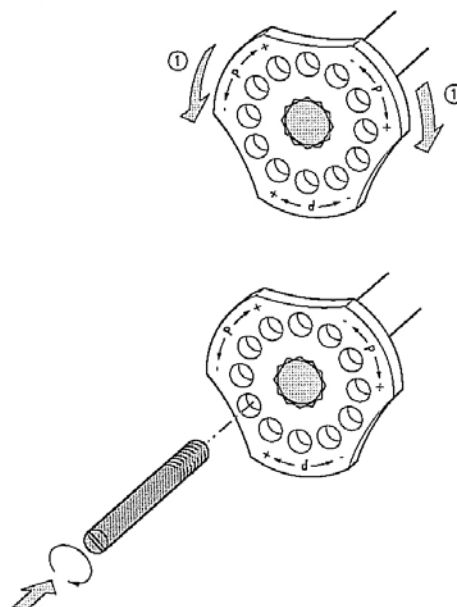
When gas mixture is extracted, the pressure in the buffer vessel drops. As soon as the pressure reaches the pre-set lower threshold value (= lower switch set point) the gas mixer turns on automatically and the buffer vessel is re-filled with gas mixture. The unit turns off automatically as soon as the buffer vessel pressure reaches the pre-set higher threshold value (= higher switch set point).

At continued gas mixture extraction the switch-on- and shut-off process repeats frequently. This is why the gas mixer's function is cycled, in particular at non-continuous gas mixture extraction.

A - Remove locking pin



B - Set upper switch set point by turning knob (1)



C - Press down knob and set lower switch set point by turning knob while it is pressed down (2)

D - Re-insert locking pin to secure set points

ATTENTION: Set points may only be changed when buffer vessel is under pressure!

Architecture

■ Body

L+T Gas Mixers are erected inside a lockable steel cabinet with a window in the front door. Despite their compact structure, the layout is generous and appropriate.

The BASIC Series of L+T Gas Mixers are designed to be wall-mounted. The cabinet is sized (HxWxD) 1000x800x400 mm. Gas feeding inlet pipes and the gas mixture outlet pipe are to be connected to the pertinent openings at the cabinet's bottom.

The COMBI Series of L+T Gas Mixers are designed to be placed upright on the floor. The cabinet is sized (HxWxD) 1600x800x400 mm. To facilitate alignment the cabinet is added four adjustable feet. Gas feeding inlet pipes and the gas mixture outlet pipe are to be connected to the pertinent openings at the cabinet's right side.

■ Weather protection

The steel cabinet housing of L+T Gas Mixers is weatherproof painted. Therefore, L+T Gas Mixers are suitable for outdoor location.

■ Connections

Inlet carrier gas:	Clamping ring for pipes with an outer diameter of 18 mm*)
Inlet additive gas:	Clamping ring for pipes with an outer diameter of 18 mm
Outlet gas mixture:	Clamping ring for pipes with an outer diameter of 18 mm**)

*) 2 x 18 mm for gas mixer sizes of 200 and 300 Nm³/h

***) 28 mm for gas mixer sizes of 200 and 300 Nm³/h

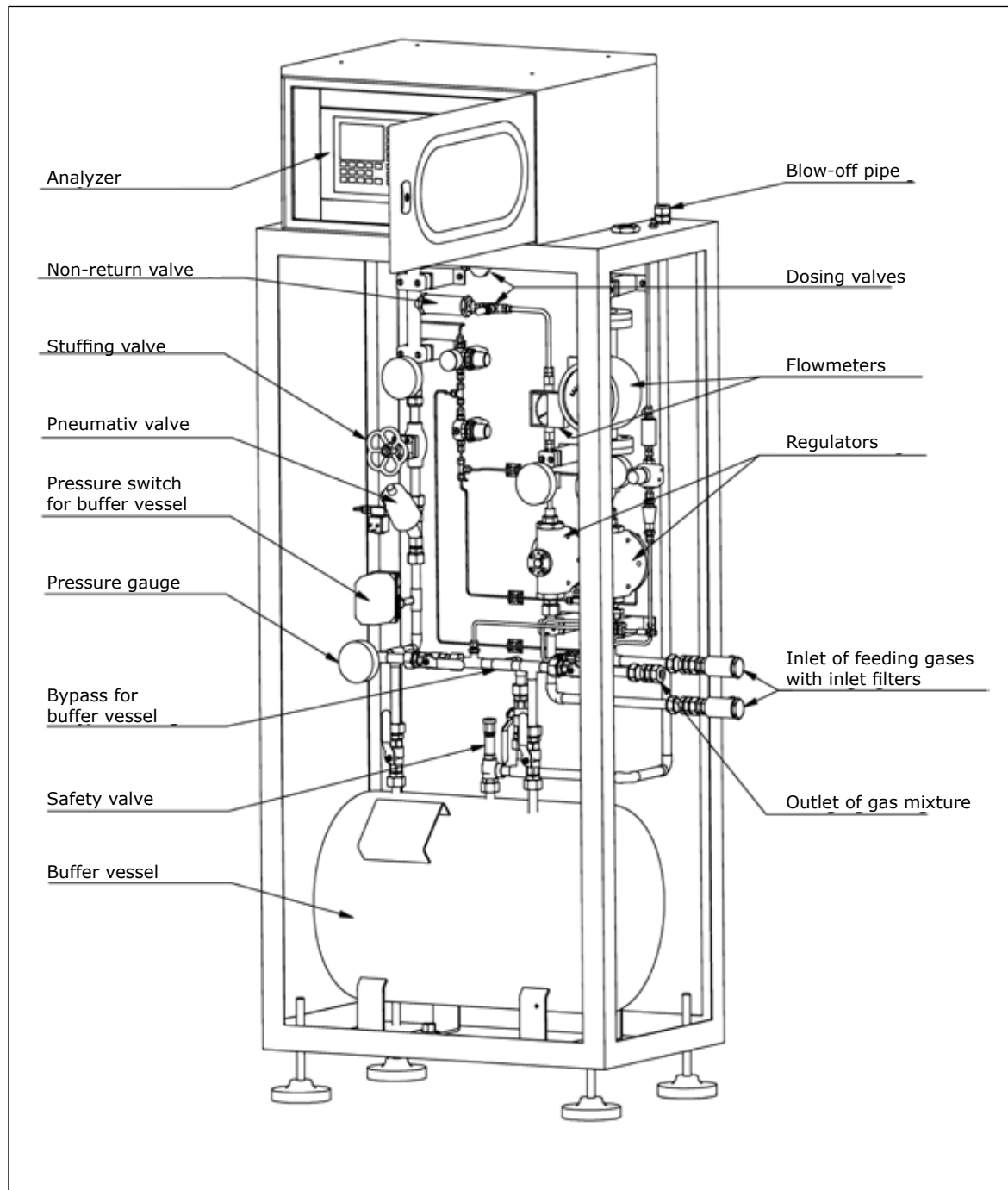


Fig.: L+T-Gas Mixer, COMBI Series, for two gases, with integrated analyzer

Scope of supply

■ Condition upon delivery

L+T Gas Mixers are always delivered in a ready-for-use condition.

On the COMBI Series of L+T Gas Mixers the buffer vessel is already installed at factory and is therefore completely integrated in the system. Once on-site, both gas feeding inlet pipes and the gas mixture outlet pipe may immediately be connected and the gas mixer commissioned.

A 5-metre cable including protective contact plug, which is required for the (electro-pneumatically ruled) pressure switch, is already included in the scope of supply.

When an analyzer is used, it is already installed at factory and is therefore completely integrated in the system. Once on site, both gas feeding inlet pipes and the gas mixture outlet pipe may immediately be connected and the gas mixer commissioned, along with the analyzer.

■ Documentation

Along with every L+T Gas Mixer we supply two copies of a comprehensive documentation including a detailed operating manual.

The manual is easily understandable, since it is compiled not only on the basis of applicable codes, but also with respect to practice. It includes numerous practical notes and support.

Delivery Program

BASIC Series for non-flammable gases

Number of gases	Max. Capacity gas mixture *)	Pressure at inlet	Pressure at outlet	Dimensions (w x h x d)	Weight	Connections at inlet	Connection at outlet	Type	Product No.
2	15 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 15-2 BASIC	2001500
	25 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 25-2 BASIC	2002500
	50 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 50-2 BASIC	2005000
	100 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 100-2 BASIC	2010000
	200 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 110 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GM 200-2 BASIC	2040100
	300 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 120 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GM 300-2 BASIC	2070100
3	15 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 15-3 BASIC	2015000
	25 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 25-3 BASIC	2250000
	50 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 50-3 BASIC	2050000
	100 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 100-3 BASIC	2030000
	200 Nm ³ /h	11 - 25 barg	2 - 9 barg	1000 x 1100 x 400 mm	approx. 110 kg	4x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GM 200-3 BASIC	2041000
	300 Nm ³ /h	11 - 25 barg	2 - 9 barg	1000 x 1100 x 400 mm	approx. 120 kg	4x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GM 300-3 BASIC	2071000

*) Gas mixers for other flow rates are equally available. They require however an individual design.



COMBI Series for non-flammable gases

Number of gases	Max. Capacity gas mixture *)	Pressure at inlet	Pressure at outlet	Dimensions (w x h x d)	Weight	Connections at inlet	Connection at outlet	Type	Product No.
2	15 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 220 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 15-2 C VA B	2313000
	25 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 220 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 25-2 C VA B	2323000
	50 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 220 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 50-2 C VA B	2333000
	100 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 220 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 100-2 C VA B	2353000
	200 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 230 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GM 200-2 C VA B	2363000
	300 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 240 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GM 300-2 C VA B	2373000
3	15 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 230 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 15-3 C VA B	2313500
	25 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 230 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 25-3 C VA B	2323500
	50 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 230 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 50-3 C VA B	2333500
	100 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 230 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GM 100-3 C VA B	2353500
	200 Nm ³ /h	11 - 25 barg	2 - 9 barg	1000 x 1800 x 510 mm	approx. 240 kg	4x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GM 200-3 C VA B	2363500
	300 Nm ³ /h	11 - 25 barg	2 - 9 barg	1000 x 1800 x 510 mm	approx. 250 kg	4x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GM 300-3 C VA B	2373500

*) Gas mixers for other flow rates are equally available. They require however an individual design.

BASIC Series for flammable gases

Number of gases	Max. Capacity gas mixture *)	Pressure at inlet	Pressure at outlet	Dimensions (w x h x d)	Weight	Connections at inlet	Connection at outlet	Type	Product No.
2	15 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 15-2 BASIC	2001700
	25 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 25-2 BASIC	2002700
	50 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 50-2 BASIC	2005200
	100 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 100-2 BASIC	2012000
	200 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GMB 200-2 BASIC	2042000
	300 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GMB 300-2 BASIC	2072000
3	15 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 15-3 BASIC	2002300
	25 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 25-3 BASIC	2002800
	50 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 50-3 BASIC	2005300
	100 Nm ³ /h	11 - 25 barg	2 - 9 barg	800 x 1000 x 400 mm	approx. 100 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 100-3 BASIC	2013000
	200 Nm ³ /h	11 - 25 barg	2 - 9 barg	1000 x 1100 x 400 mm	approx. 100 kg	4x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GMB 200-3 BASIC	2043000
	300 Nm ³ /h	11 - 25 barg	2 - 9 barg	1000 x 1100 x 400 mm	approx. 100 kg	4x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GMB 300-3 BASIC	2073000

*) Gas mixers for other flow rates are equally available. They require however an individual design.



COMBI Series for flammable gases

Number of gases	Max. Capacity gas mixture *)	Pressure at inlet	Pressure at outlet	Dimensions (w x h x d)	Weight	Connections at inlet	Connection at outlet	Type	Product No.
2	15 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 220 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 15-2 C VA B	2314000
	25 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 220 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 25-2 C VA B	2324000
	50 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 220 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 50-2 C VA B	2334000
	100 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 220 kg	2x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 100-2 C VA B	2354000
	200 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 230 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GMB 200-2 C VA B	2364000
	300 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 240 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GMB 300-2 C VA B	2374000
3	15 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 230 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 15-3 C VA B	2314500
	25 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 230 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 25-3 C VA B	2324500
	50 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 230 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 50-3 C VA B	2334500
	100 Nm ³ /h	11 - 25 barg	2 - 9 barg	820 x 1700 x 510 mm	approx. 230 kg	3x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 18 mm	GMB 100-3 C VA B	2354500
	200 Nm ³ /h	11 - 25 barg	2 - 9 barg	1000 x 1800 x 510 mm	approx. 240 kg	4x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GMB 200-3 C VA B	2364500
	300 Nm ³ /h	11 - 25 barg	2 - 9 barg	1000 x 1800 x 510 mm	approx. 250 kg	4x Clamping ring connections for pipe OD 18 mm	Clamping ring connection for pipe OD 28 mm	GMB 300-3 C VA B	2374500

*) Gas mixers for other flow rates are equally available. They require however an individual design.

Spare Parts

Availability of spare parts for L+T Gas Mixers is guaranteed minimum for ten years.

Maintenance

Thanks to using high grade components for producing L+T Gas Mixers, these require only a notably low maintenance. The maintenance interval recommended is twelve months.

As soon as the transparent glass door has been unlocked, L+T Gas Mixers offer easy and convenient access to all components. These are arranged clearly, placed purposefully and mounted via detachable connections. Thus, they can be disassembled and reassembled fast and conveniently

Annexes

Annex 1

Design and Assembly of L+T Gas Mixers is accomplished under strict adherence to following rules:

Concerning design and composition (for marketing)

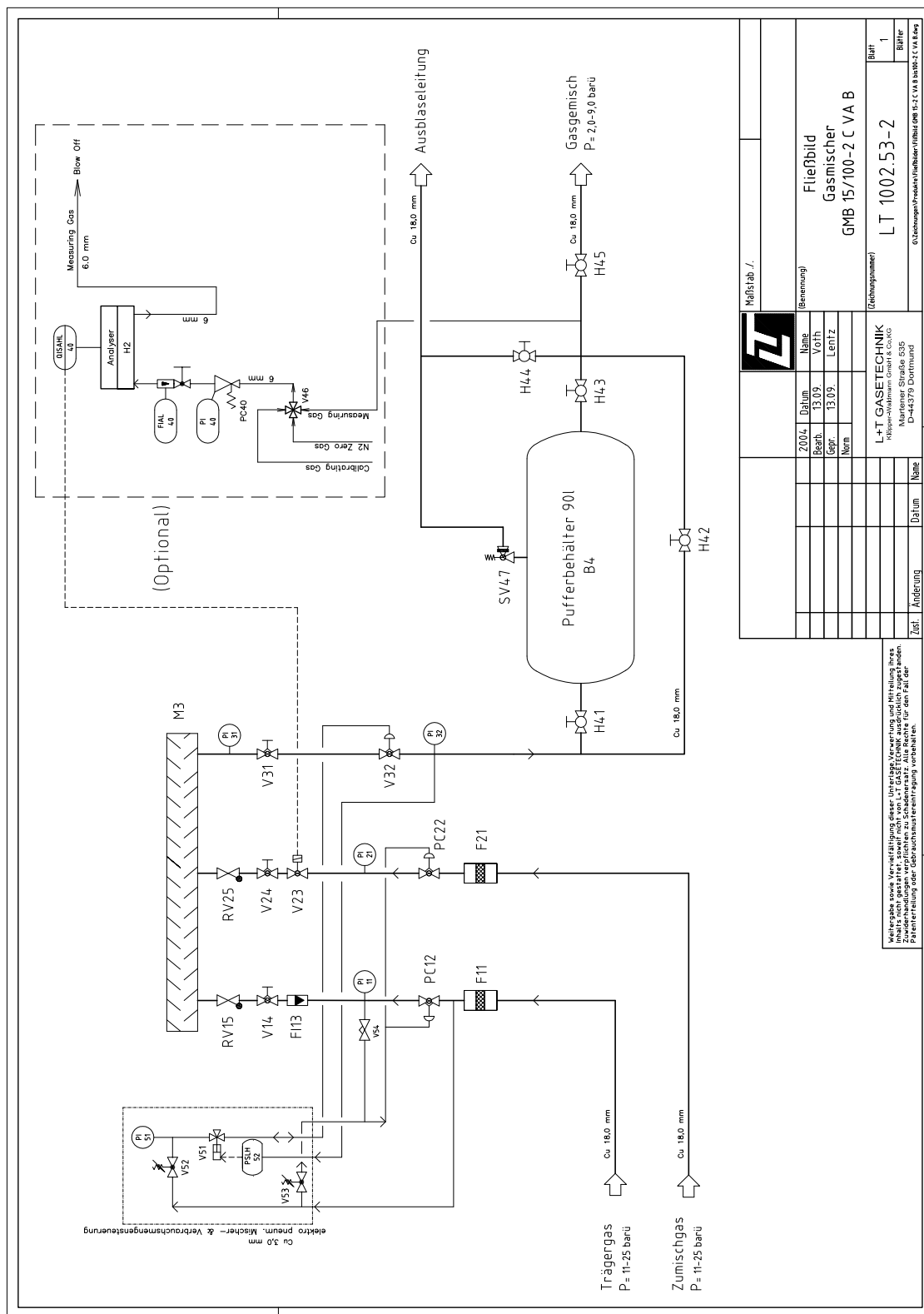
- Directive on protection against explosion
- Directive on pressure vessels
- Directive on machines
- Directive for low voltage equipment
- Directive for EMV
- European and national standards, in particular
 - DIN EN ISO 12100-1/2 Safety of machines
 - DIN EN 746 Industrial thermal process equipment
 - DIN EN 954 Safety related parts of control panels
 - DIN EN 1050 Guidelines for risk assessment

Concerning operation (for assembly, installation and operation)

- Directive on industrial safety, in particular
 - §14, 15,16 Test of equipment in areas with risk of explosion
- Directive on industrial safety, in particular
 - Technical rules on vessels
 - Technical rules on pipes
 - Technical rules on gases
- Directive on accident prevention, in particular
 - BGV A1 General instructions
 - BGV A3 Electrical equipment and production facilities
 - BGR 500 Teil 2 Welding, soldering, cutting and related techniques
 - BGR 500 Teil 2 Gases
- BG-Directives
 - BGR 104 Rules for explosion prevention
 - BGI 518 or TO 23 Use of static gas alert equipment to prevent explosions
 - BGR 132 Rules to prevent ignition as a result of electrostatic charge
 - BGI 612 Hydrogen

Annex 2

The following drawing shows the P&ID Diagram of a L+T Gas Mixer, COMBI Series, in the version for two gas components, one of them flammable.



L+T GASECOTECHNIK Klöpffer-Waldmann GmbH & Co.KG D-44479 Dortmund		LT 1002.53-2	
Name: Gasemisch		Blatt: 1	
Norm: GMB 15/100-2 C VA B		Blätter: 1	
Zust.: Änderung		0.000000/Produktionsverfahren/Reifegrad 005 15.2 C VA B 1002.2 C VA B Rev	

Wiedergabe sowie Verweildauer, dieser Unterlagen, Vervielfältigung und Mitteilung ihres Inhalts an Dritte ist ohne schriftliche Genehmigung der L+T GASECOTECHNIK GmbH & Co. KG. Änderungen sind durch die Zeichenfolge zu verdeutlichen. Alle Rechte für den Fall der Patentierung sind durch die Zeichenfolge vorbehalten.

Annex 3

Example of a TÜV Certificate for a L+T Gas Mixer, COMBI Series:



ZERTIFIKAT

EG-Prüfung des Produktes
gemäß Modul F
nach Richtlinie 97/23/EG

Zertifikat-Nr.: 07 202 1403 Z 0690 / 8 / D / 0073

Name und Anschrift des Herstellers: **L + T Gasetechnik
Klöpffer-Waldmann GmbH & Co. KG
Martener Str. 535
44379 Dortmund**

Hiermit wird bescheinigt, dass die Ergebnisse der an dem unten genannten Druckgerät vorgenommenen Prüfungen die Anforderungen der Richtlinie für Druckgeräte 97/23/EG erfüllen. Das Druckgerät entspricht dem Baumuster und ist mit dem abgebildeten Zeichen gekennzeichnet:

CE 0045

Geprüft nach Richtlinie 97/23/EG	:	EG-Prüfung des Produktes (Modul F)
Prüfbericht Nr.	:	1403 P 0690 / 8 / D / 0073 (8104817822)
Beschreibung des Baumusters	:	Gasmischanlage GM 50-2 C VA B
Herstell-Nr.	:	2443
Kategorie	:	IV
Zertifikat-Nr. des Baumusters	:	04 202 1 420 04 00008
Fertigungsstätte	:	L + T Gasetechnik Klöpffer-Waldmann GmbH & Co. KG Martener Str. 535 44379 Dortmund

Dortmund, 17.07.2008



TÜV CERT-Zertifizierungsstelle
für Druckgeräte der
TÜV NORD Systems GmbH & Co. KG

(Exner)

Benannte Stelle, Kennnummer 0044

Mitglied der



Logo der CEOC (Central European Organisation of Certified Bodies)

TÜV NORD Systems GmbH & Co. KG - Tel. +49-(0)231-5186-270
Langemarkstr. 20 Fax +49-(0)231-5186-286
45141 Essen e-mail wbraeutigsm@tuv-nord.de

Rev 0

Annex 5

Excerpt of our Reference List:

Branch of Industry	Reference
Analysis	ABB, Emmerson
Biosensor	Universität Münster
Chemistry	BASF, Degussa, Glyco
Cryogenic engineering	Ruck-Gase
Electronics	Bosch, Osram-Werke
Electroplating	Galvalange
Energy	Preussag
Food	Herta, Pfanni-Werke
Furnace engineering	Otto Junker, WSP
Gas	Air Liquide, Air Products, Linde, Messer Griesheim, Praxair, Rießner-Gase, Sauerstoffwerk Friedrichshafen, TGHM, WestfalenGas
Glass	Glaverbel, Pilkington, Schott Lithotec
Healthcare	Klinikum Großhadern
Heating technology	Stiebel-Eltron, Vaillant-Werke
Metal	Blohm + Voss, BMW, Daimler-Chrysler, Deutsche Bahn, Fichtel & Sachs, ThyssenKrupp, Volkswagen, Wieland-Werke
Oil	Bayernoil Raffineriegesellschaft
Pharmaceutical technology	Boehringer Ingelheim, Schering
Semiconductor technology	Phycomp, Siemens



1972 ▲▲

▼▼ 2009



We will gladly provide you with information on other products of our program:

GAS SAFETY DEVICES

- Quick couplings for gas hoses, with automatic gas cut-off valve
- Flashback arrestors to fit pressure reducers, hoses, and torches in welding technique
- Safety devices to fit centralized gas installations for flammable gases and acetylene

CENTRAL GAS SUPPLY

- Cylinder manifolds and bundle manifolds
- Main pressure regulating stations, both for manual and for automatic operation
- Pressure regulators, pneumatically ruled, and pressure regulation stations
- Pressure regulators, mechanically ruled
- Tapping points

PLANT ENGINEERING AND CONSTRUCTION

- High-end pressure control stations
- Large-sized, high-duty gas mixing stations, customized

We will gladly advise you on our services for individual gas systems.

L+T GASESTECHNIK 
Klöpper-Waldmann GmbH & Co. KG

**Martener Strasse 535
44379 Dortmund
GERMANY**

**Phone +49 231 961070 0
Fax +49 231 613844**

**mail@lt-gasetechnik.de
www.lt-gasetechnik.de**

member of the weyer group

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