

# LEWA metering and mixing systems

Complete solutions from a single source.





**Industry:** Energy utilities

**Installation location:** Middle East

**Application:** Metering of liquid ammonia and phosphate solution for treating of boiler feedwater, volume flow up to 7.90 gph at a max. pressure of 1,880 psig

**LEWA solution:**

- Complete system with LEWA diaphragm pumps
- Electrical cabinet with control system
- Storage container with agitator and exhaust air scrubber



In many manufacturing plants, the metering and mixing of liquids plays an important role as a procedural step that ensures the quality of the end product.

LEWA develops and supplies customized metering and mixing systems for numerous industries and a wide variety of application areas.

The performance spectrum ranges from laboratory tests and design, all the way to the commissioning of the entire operational system.

We advise you in all project phases using our breadth of process engineering expertise. In doing so, we make use of modern tools such as a lab with measurement data recording, 3D CAD systems, calculation programs for pipelines and comprehensive databases for system components. In addition to process technology and our knowledge regarding intelligent process control, we also boast many years of experience in the associated measurement technology and control engineering areas. At our facilities, we can design and optimize control systems using LEWA software solutions and offer process visualization and integration into higher-level process control systems.

**Title page image:**

**Industry:** Cleaners and detergents

**Installation location:** Germany

**Application:** Fully automatic production of fabric softeners, total output 16,53 tn. sh/h

**LEWA solution:**

- Complete system with LEWA diaphragm pumps
- Storage tanks with pipework and fittings
- Heat exchangers
- Mass-flow meter
- Electrical control system with process visualization, recipe management and continuous logging





**Industry:** Food & Beverages

**Installation location:** Switzerland

**Application:** Homogenizing special milk for maximum food safety at a pressure of 7,250 psig

**LEWA solution:**

- Complete homogenizer with LEWA triplex diaphragm pump in a hygienic design
- With a two-stage homogenization valve (1,160/7,250 psig)
- Water-cooled synchronous torque motor
- Hygienic and aseptic design, with FDA approval and in accordance with EHEDG
- CIP- and SIP-capable
- Wetted parts in stainless steel, surfaces roughness  $Ra < 0.8 \mu m$ , mechanically polished



# LEWA metering and mixing systems. The advantages at a glance.

1



## Customized

We design and produce customized solutions for everything from pumps to turnkey systems. In this process, all components are synchronized with one another and optimized. With LEWA diaphragm pumps, flow rates between 0.0026 gph and 47,550 gph and discharge pressures up to 17,400 psig are possible.

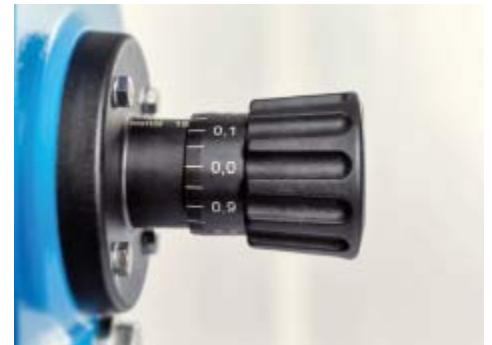
2



## Complete

We deliver everything from a single source. From fluid evaluations and detailed pipeline calculations in advance, all the way to our own software developments for control systems and process visualization. Our highly skilled employees are available to you throughout the entire service life of the systems.

3



## Precise

We prefer to use LEWA diaphragm metering pumps in our systems. They offer a high level of metering accuracy, an infinitely variable stroke length and stroke frequency setting for a large adjustment range. Pumping characteristics are nearly pressure-independent for easy, precise monitoring.

4

USER	START SCREEN	
Lewa	AUTO	REMOTE
FLUID	SETPOINT	ACT. VALUE
FLUID	25.0	24.95
FLOWRATE	100.0	25.2
TOTALIZER	54	54
SPEED	65	65
STROKE	1.0	0.2
METERING DEV.		

## Safe

LEWA systems are designed in accordance with the required safety standards and meet the most stringent requirements. We developed the LEWA smart control to provide optimum monitoring of metering systems. Its integrated diagnostic function ensures additional safety.

5



## Proven and reliable

LEWA has over 60 years of experience in numerous industries. Our systems and pumps operate around the clock in many application areas.

6



## Global

LEWA is globally organized. Fast spare part deliveries, specialized maintenance and repairs are available on-site all over the world.

# Customized metering and mixing systems

## Customized metering and mixing systems from LEWA come from a single source.

All components are precisely synchronized to one another and ensure a high level of availability and operating reliability in the systems. LEWA designs, builds and delivers a wide variety of solutions: from a metering pump with installed accessories and metering systems, all the way to complete turnkey systems. A design that is cost-effective and technically optimized is always our number one priority. Of course, our customized solutions comply with the legal regulations and standards.

We take care of all the details. We use the latest technologies to develop the ideal customized metering or mixing system and guarantee proper functioning. As the leading pump manufacturer, we do not compromise on the quality of the components.

## Components used\*

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LEWA metering or process pumps

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Storage tank

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Transfer or barrel pumps

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Base frame

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Cooling and heating elements

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Agitators

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Static or dynamic mixers

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Piping

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Isolation- and control valves

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Filters or strainers

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Pressure relief or safety valve

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Electrical cabinet with control system and process visualization

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Flow meters

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Pressure monitoring or measurement

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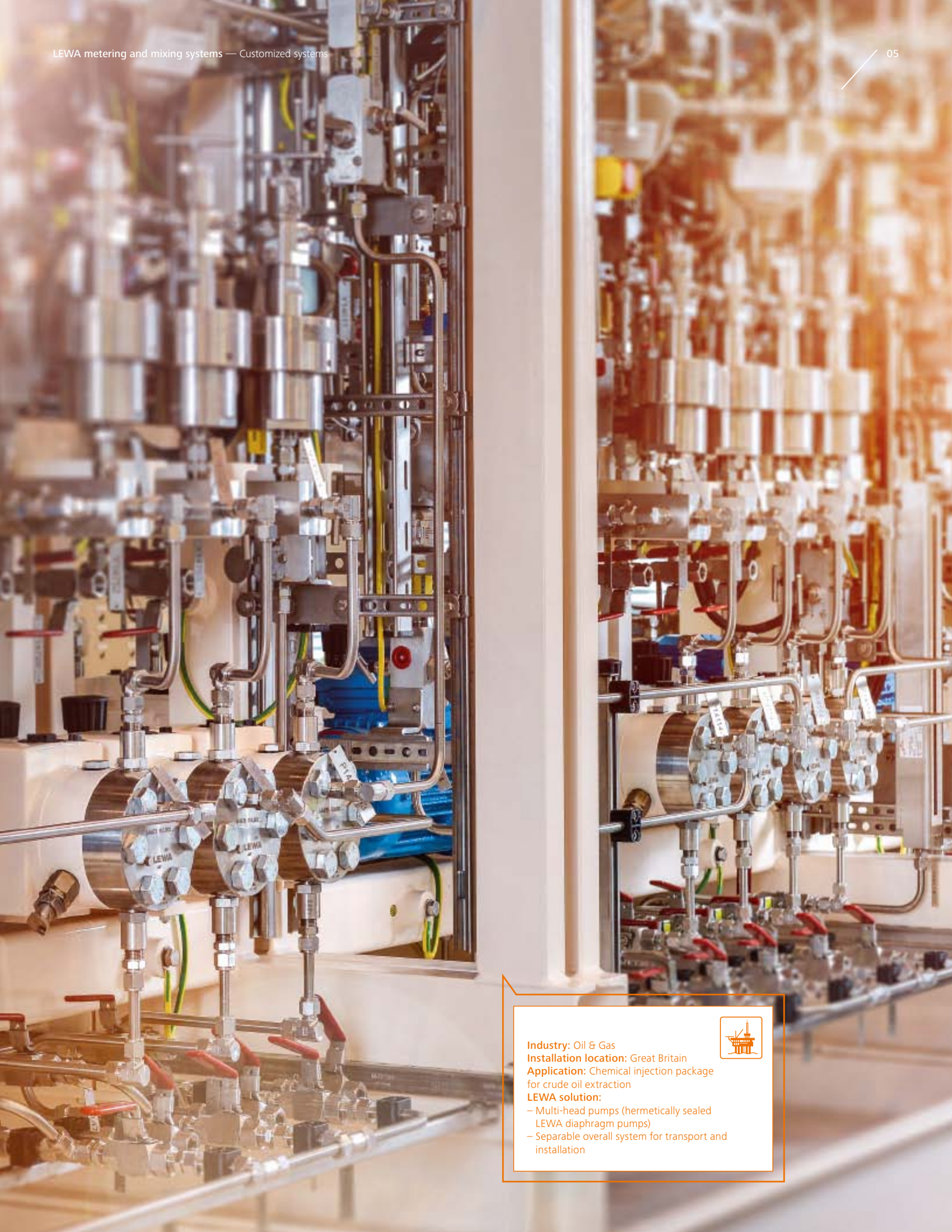
Level measurement

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Temperature measurement

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\* depending on the application



**Industry:** Oil & Gas

**Installation location:** Great Britain

**Application:** Chemical injection package for crude oil extraction

**LEWA solution:**

- Multi-head pumps (hermetically sealed LEWA diaphragm pumps)
- Separable overall system for transport and installation



Performance overview

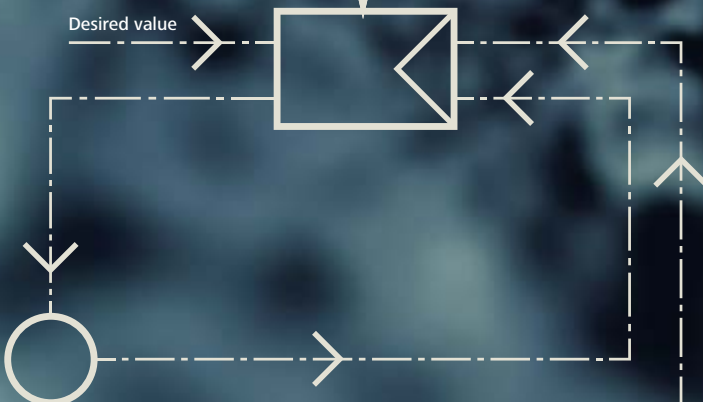
Pump types with usable discharge pressure	up to 17,400 psig
Flow rate	0.0026 gph up to 47,550 gph *
Temperature	-40.0 to +752.0 °F *
Viscosity	up to 1,500,000 mPa·s

\* depending on the type and boundary conditions

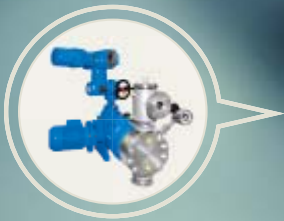
Perfect controller:  
LEWA smart control



Desired value



Exact adjustment:  
via the stroke length  
and/or speed



Precision right from  
the beginning:  
LEWA metering pumps  
or a suitable alternative

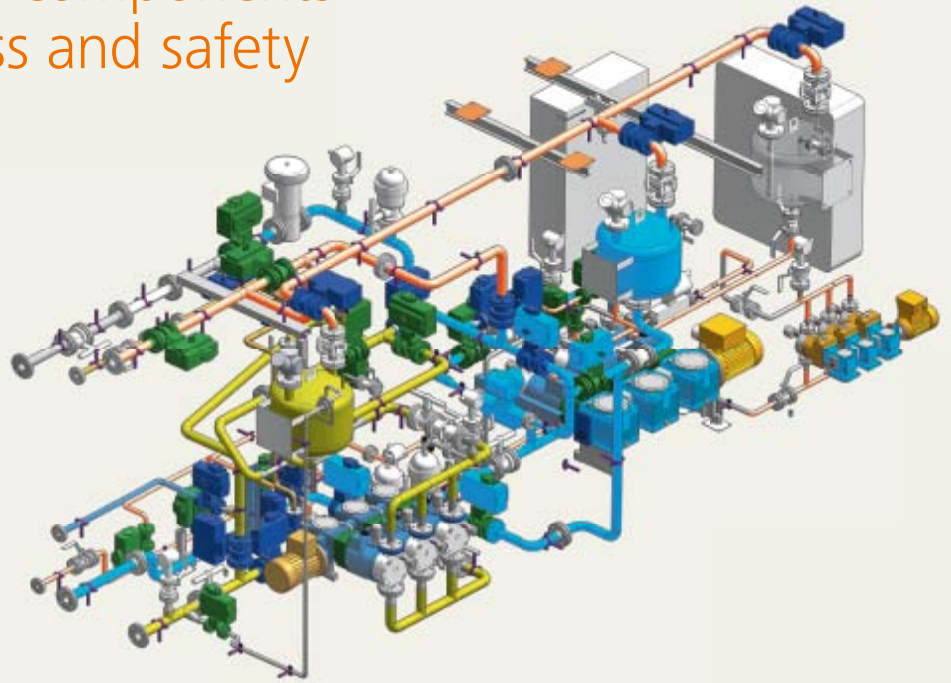


Monitored metered flow:  
Different flow meters  
can be used





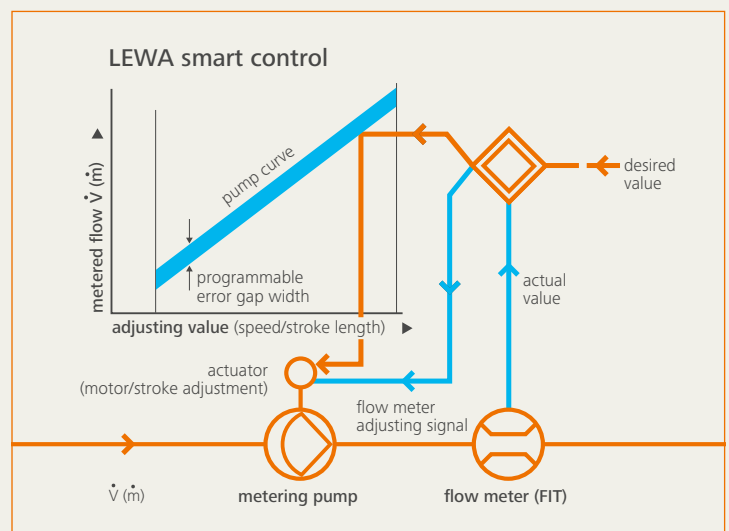
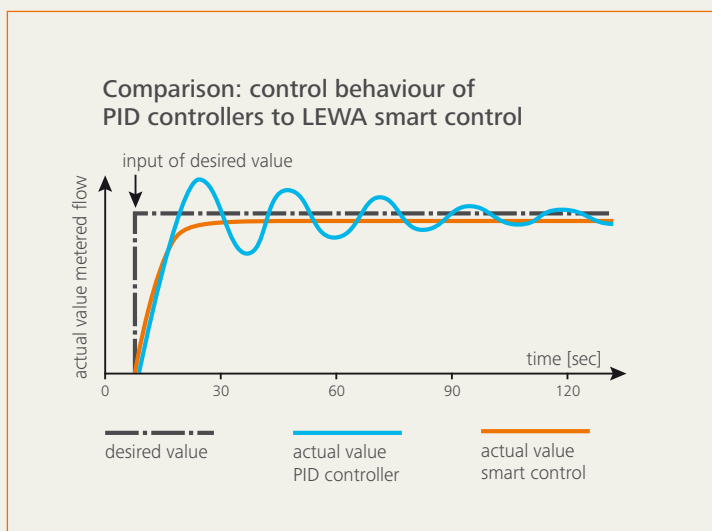
# The most important components for cost-effectiveness and safety



## The compact controller LEWA smart control

For optimum monitoring of metering systems, we provide the LEWA smart control, which has been developed specifically for this reason.

- The software allows you to store the characteristic curve of the pump, including the error spectrum and control range.
- The programmed adaption function - the adaptive control - ensures that the actual value is adjusted quickly without causing substantial transient oscillation that is common in conventional PID controllers.
- The pump adjusting value (motor speed and/or stroke length) and flow meter signal are compared and continuously checked for plausibility.
- Integrated diagnostic functions indicate deviations and malfunctions. This allows their causes to be found efficiently, which ensures high system availability.
- Operation via a 7" touch panel in the language of the customer



In the basic version, LEWA smart control controls a metering line. The frequency converter and external communication are integrated in a similar manner.



## Continued: LEWA smart control

The following expansions are available:

- Upgrade to bus communication (e.g. Profibus-DP, Profinet, Ethernet, Modbus TCP-IP)
- Larger touch panel (optional also for use in potentially explosive zones I and II)
- Modular expansion to a second metering line and/or to the electric stroke adjustment (EHV) to expand the adjustment range
- Monitoring of additional parameters (e.g. fill level, conductivity) using additional sensors
- In case of more control loops: Expansion to a larger control system with the same function

Application examples:

- Control of the metered flow: Specification and maintenance of a continuous mass or volume flow
- Batch metering: Filling or refilling processes of an adjustable metering quantity X (e.g., topping up to fill level (e.g., tank), metering of a specific quantity)
- Manual metering: Setting the speed, starting/stopping at will
- Mixing processes (e.g., dilution of caustic soda): Control of two metered flows in the correct ratio to each other

## Advantages

Assisted by up to four actuators, the controller manages one or two closed control loops. This way you can control either one redundant system or two independent systems. Metering pumps and measuring systems of nearly any type can be used

The operator can use a 7" touch panel to choose between various layouts and overviews (target/actual value, curve display, etc.)

Easy to commission, thanks to preconfiguration at the factory

Compliance with international standards such as EN standards, UL, EMC



## The pumps

The pump is the heart of the LEWA system. We prefer using diaphragm metering pumps from our own production. These provide:

- Continuous adjustment of stroke length and frequency, ensuring an accurate and wide adjustment range
- Pressure has virtually no influence on the pumping characteristics, which makes monitoring easy and precise
- High metering accuracy paired with flow measurement/monitoring ensures reliable and reproducible production

Our expertise also helps when it comes to integrating other pump types, provided that these lead to a better result based on the application, flow rate or composition of the pumping fluid: All components are optimally matched to your requirements.

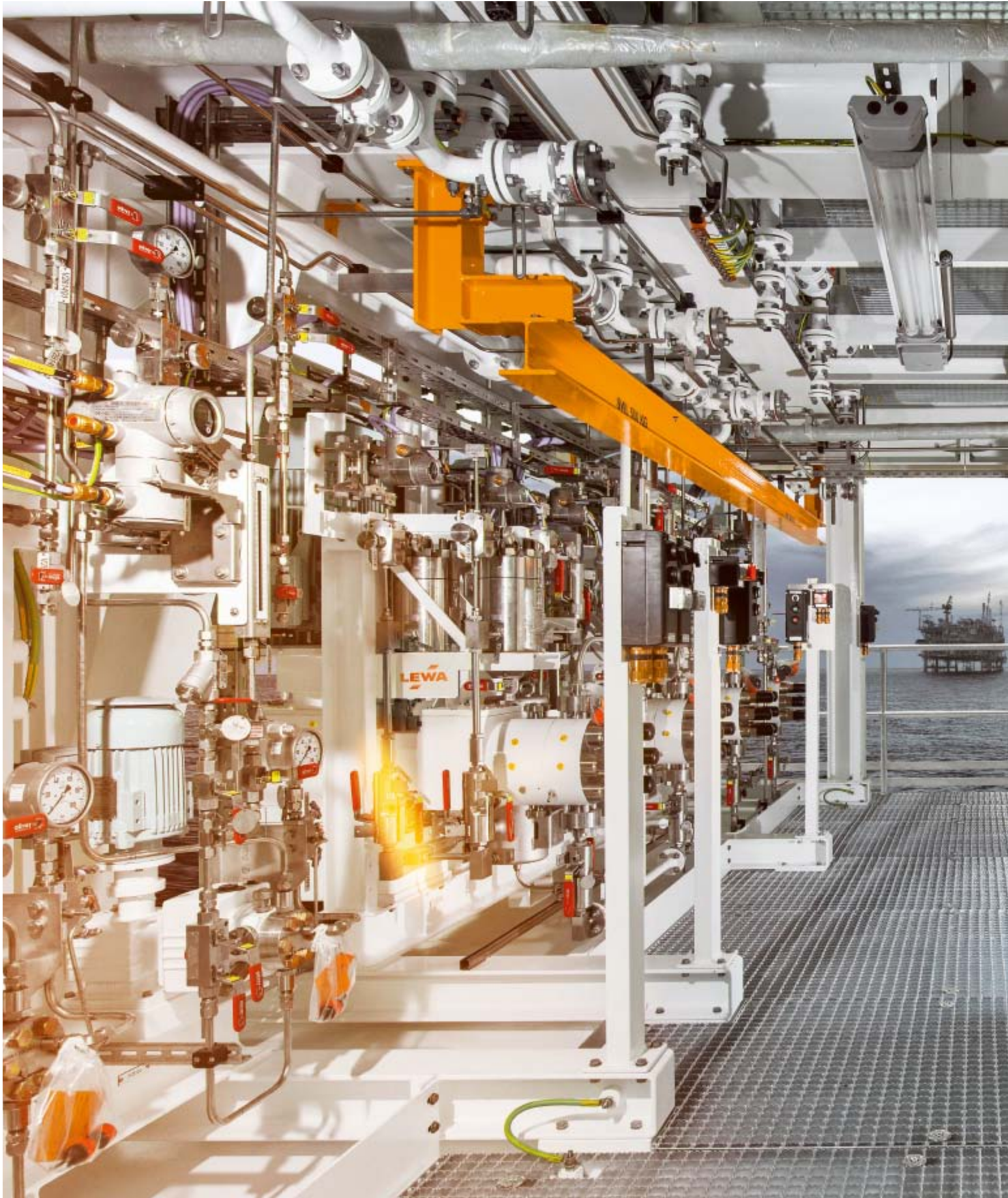


## The flow meters


Flow meters measure the volume flow or mass flow and transmit the measured actual value to the controller. We select the flow meters suitable for the application accordingly.

## Everything is perfectly matched and from a single source

Pumps, measuring instruments (e.g., flow meters), control technology and engineering, as well as fittings and pipes need to be perfectly matched. This is LEWA's core competency. Components are selected based on cost-effectiveness and technology. Only process-engineering quality products are used, which have been tested to make sure they work together in the system without a hitch.





**Industry:** Oil & Gas   
**Installation location:** Great Britain  
**Application:** Chemical injection on FPSO  
**LEWA solution:**  
– Design, procurement and installation  
– Diaphragm pumps for maximum pressure (8,700 psig)  
– Built for ambient temperatures from 21.2 to +104.0°F



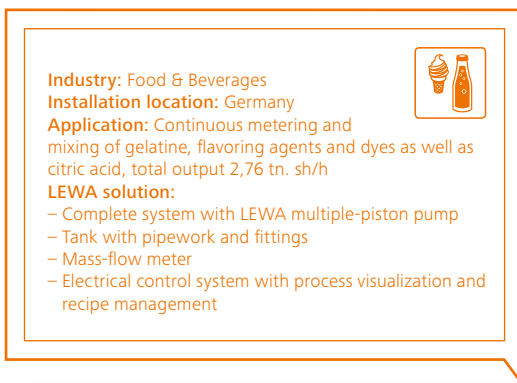
**Industry:** Pharmaceuticals & Biotechnology

**Installation location:** Germany

**Application:** Metering of liquids for applications with pharmaceutical extruders, volume flow of 2.64 gph at a pressure of 725 psig

**LEWA solution:**

- Complete system with heated storage tank, magnetic agitator and control system
- LEWA ecoflow triplex diaphragm metering pump for low-pulsation metering
- Developed while taking into account all qualification and validation steps (cGMP, GAMP)



**Industry:** Food & Beverages

**Installation location:** Germany

**Application:** Continuous metering and mixing of gelatine, flavoring agents and dyes as well as citric acid, total output 2,76 tn. sh/h

**LEWA solution:**

- Complete system with LEWA multiple-piston pump
- Tank with pipework and fittings
- Mass-flow meter
- Electrical control system with process visualization and recipe management



# References from customized metering and mixing systems



**Industry:** Chemicals

**Installation location:** Germany

**Application:** Metering of viscous fluids such as UV stabilizer and flame retardant at a pressure of 5,800 psig

**LEWA solution:**

- Metering system with LEWA diaphragm metering pump completely installed in a thermal cabinet
- Operating temperature 266.0°F
- Heated with steam



**Industry:** Refineries

**Installation location:** Middle East

**Application:** Metering of corrosion inhibitors, anti-foaming agents, deposit inhibitors, volume flow 39.63 gph at a pressure of 580 psig

**LEWA solution:**

- Metering system complete with storage tank, piping, fittings and instrumentation
- Hermetically sealed LEWA ecoflow diaphragm pumps
- Storage tanks with nitrogen blanketing and design in accordance with ASME





**Industry:** Oil & Gas

**Installation location:** Saudi Arabia

**Application:** Chemical injection package for injecting corrosion inhibitors

**LEWA solution:**

- Hermetically sealed diaphragm pumps
- Pumps accessible from the front for maintenance
- Optimized for low space requirements
- On-site control unit



**Industry:** Oil & Gas

**Installation location:** Syria

**Application:** Methanol injection for preventing hydrate formation

**LEWA solution:**

- Hermetically sealed LEWA diaphragm pumps
- Package with base frame, tank and roof for unprotected installation





# References from customized metering and mixing systems



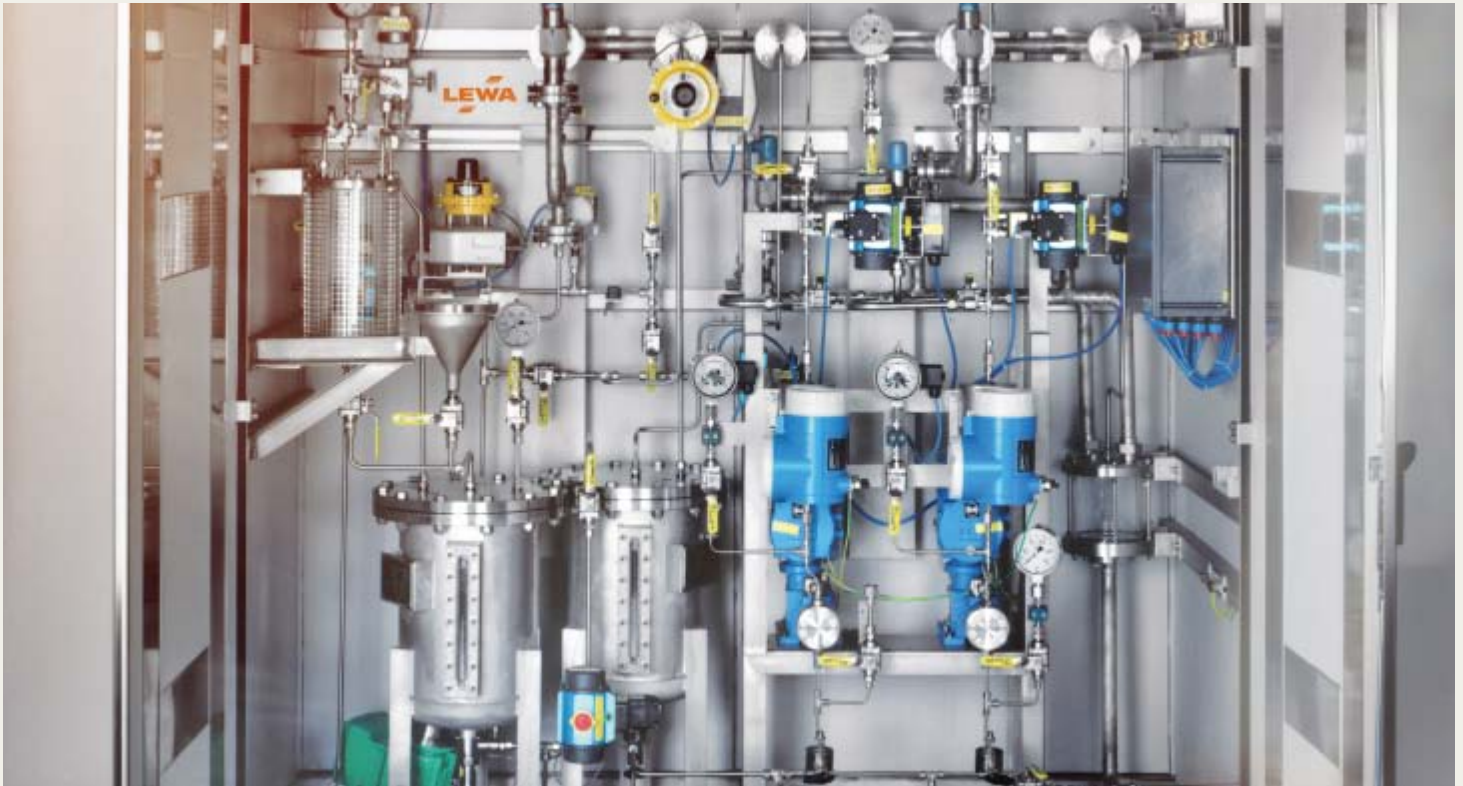
**Industry:** Petrochemicals

**Installation location:** Germany

**Application:** Metering of additives for improving the polymer end product, flow rate 2 x 0.26 gph at a pressure of 650 psig

**LEWA solution:**

- Metering system completely installed into the safety cabinet
- Hermetically sealed LEWA diaphragm pumps with pneumatic stroke adjustment
- Storage container, fittings and pipework
- Control cabinet with closed control loop and mass-flow meter



**Industry:** Plastics

**Installation location:** Germany

**Application:** Melting and metering of flame retardants

**LEWA solution:**

- Metering system in thermal cabinet
- Melting tank with agitator
- Operating temperature 176.0°F
- Electrically heated





# Preconfigured metering packages and systems

In addition to the entirely customized metering and mixing systems, for certain industries, we also provide preconfigured systems that have the same main components, which means they can be implemented even more cost-effectively. Of course, we can also take into account specific requirements here.

## LEWA ecofoam – The metering system for blowing agents in extrusion processes

In the extrusion process, metering of blowing agents is of great importance for ensuring constant quality of the end product. LEWA ecofoam is a system for metering blowing agents such as butane, CO<sub>2</sub>, halogenated hydrocarbons, pentane and propane into the plastic melt of an extrusion process.

### Performance overview

Discharge pressure	725 to 7,250 psig
Flow rate	1.1 to 550 lbs/h



## Benefit to you

Constant quality of the foamed product by means of:

- Exact metering even with fluctuating extruder pressures
- Using the LEWA smart control with a faster response time than conventional PID controllers

High operating reliability through robust and hermetically sealed LEWA ecoflow pump technology

High productivity through long periods between maintenance

High expertise with blowing agents, for example, when switching from butane to CO<sub>2</sub>

## Application examples

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Polystyrene foam (PS foam) – manufacturing of insulation boards and food packaging containers

Polyethylene foam (PE foam) – manufacturing of packaging foils, impact sound insulation and cover seals

Polyurethane foam (PU foam) – manufacturing of insulation boards and pipe insulation

Foam pellets (EPS/EPP/EPE) – reusable transport packaging and molded parts for bumper cores

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### Essential components:

- LEWA ecoflow diaphragm metering pump
- Strainer in suction line
- Contact pressure gauge for pressure monitoring in the suction- and discharge line
- Safety valve for protecting the metering system from overpressure
- Mass-flow meter
- Control cabinet

### For CO<sub>2</sub> applications:

- Heat exchanger in the suction line for cooling the CO<sub>2</sub> before inlet
- Cooling jacket on each pump head
- Compact chiller providing the cooling medium into cooling circuit

These components are piped up and installed on a common base frame. A control cabinet with all of the electrical components, including the specially developed LEWA smart control for operating the metering system, can be integrated on the base frame or delivered separately for installation in the customer's control room.







## LEWA odorizing systems

For more than 40 years, LEWA has been developing systems for the odorization of gases such as natural gases, biogases, and liquefied gases. They ensure the accurately monitored, quantity-based addition of odorous substances. That is why these special gases have to be processed with vacuum-sealed systems during distribution, reloading and transport.

With LEWA odorizing systems, the appropriate odorant is metered reliably, proportionally and cost-effectively.

### Performance overview

<b>Discharge pressure</b>	min. 29.0 – max. 4,350 psig
<b>Flow rate</b>	min. 0 – max. 10.57 gph



## Benefit to you

Quantity-based system controlled by gas flow with closed control loop

Design that complies with applicable guidelines (including the German Federal Water Act (WHG), German Technical and Scientific Association for Gas and Water (DVGW), ATEX, TR CU, ASME, Pressure Equipment Directive, German Technical Instructions on Air Quality Control (TA-Luft), and German Technical Regulations for Combustible Liquids (TRbF)).

Maximum metering accuracy, usually better than +/- 1%

LEWA odorizing systems are suitable for all odorants. EM, DMS, TBM, THT and sulfur-free substances have been metered reliably and with extreme precision for many years

## Application examples

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You can odorize numerous gases with our systems: natural gas, biogas, LPG, oxygen, nitrogen, carbon dioxide, hydrogen, methane, and many more.

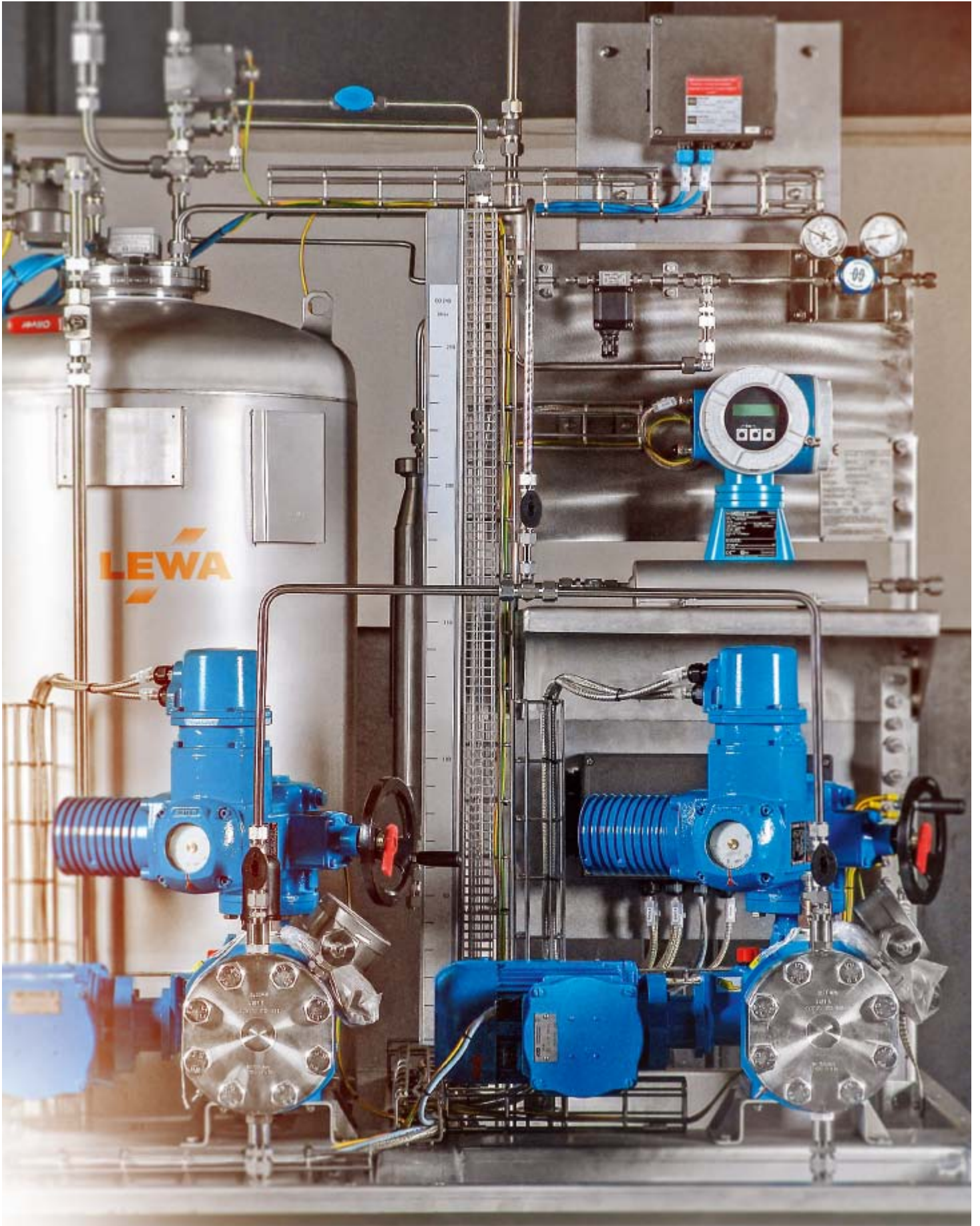
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### Essential components:

- Diaphragm metering pumps for vacuum sealed and reliable metering (magnetically, pneumatically or electrically operated)
- The metal diaphragms are absolutely diffusion-proof
- Tested control systems, even with ex-proof design
- Vessels with a visible fill level control, which can be used simultaneously while the pump is being calibrated
- The LEWA KMM 1 flow meter is unique and accurately measures even the smallest volume flows
- Active carbon filter for exhaust air purification
- Drip trays in accordance with the regulations for stationary systems for storing water pollutants
- All essential components can be configured individually to meet your requirements







# Creating Fluid Solutions. For more value created.

1



Research and Development

2



Feasibility studies

3



Concept/design

4



Consultation and  
fluid evaluations

5



Preliminary process  
engineering tests

6



Technical clarification

7



Quotation creation

8



Order fulfillment

Everything from a single source.  
LEWA is not just your supplier for metering pumps, process diaphragm pumps and metering or mixing systems. LEWA is also your competent partner throughout all phases of your project.

For us, this means advising you before and after the order placement, engineering the pumps and systems with a final, on-time implementation and complete, global service offering repairs, maintenance and training. We are here for you whenever you need us and offer you our decades of experience.

9



Software development

10



Production

11



Installation

12



Construction of diagnostic systems

13



On-site commissioning

14



Qualification/validation

15



Training

16



Service and maintenance contracts worldwide

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