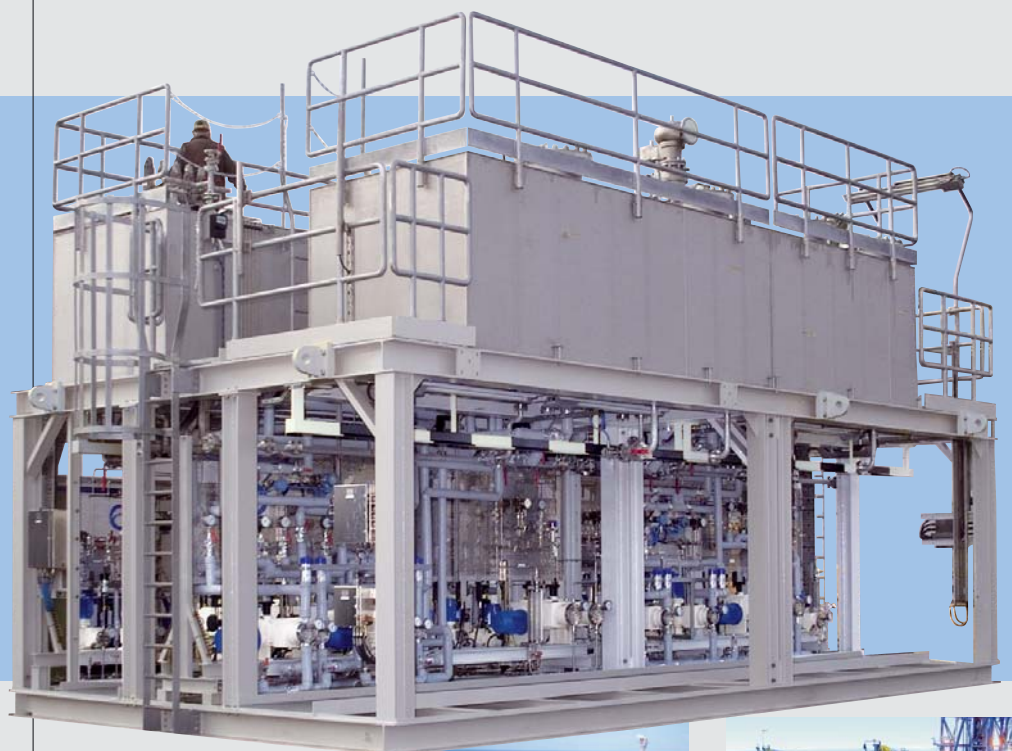


Pumps & Packages for Oil & Gas

Offshore and Onshore



Injection Packages

- Methanol
- Chemicals
- Glycol
- CO₂
- Sour Gas
- Closed Drain

motralec

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www.motralec.com

LEWA – Real solutions to your metering, mixing, and injection package needs ... Offshore and Onshore

The oil and gas industry has special requirements and regulations that demand both qualified equipment and an experienced supplier.

The goal of this bulletin is to demonstrate the broad range of LEWA pumps, and our solutions-oriented experience available to be put to work on your project today.

We offer a complete program of both packed plunger and sealless hydraulically actuated diaphragm pumps, with a total performance range covering flows up to 180 m³/h (45,000 gph) and pressures up to 1,200 bar (17,000 psi).

The trend in modern oil and gas installations is to the use of fail-safe and fault tolerant hydraulically actuated diaphragm pumps for safety, environmental, loss prevention, and process integrity reasons.

Some major advantages of LEWA diaphragm pumps are:

- Totally leak-tight, with secondary containment by our "sandwich" diaphragm.
- Diaphragm condition monitor and built-in-hydraulic pressure relief for safety.
- High suction pressure capability, even with difficult-to-handle liquids such as aggressives, slurries, low lubricity, low viscosity, toxic, flammable, etc.
- Exceptionally long up-times without maintenance.

LEWA offers you:

- Custom engineered, expertly built metering pumps and packages.
- Complete, ready-to-use solutions for your specific application.
- Supporting documents and certification including calculation details and comprehensive testing when required.
- Technical assistance, commissioning, and service worldwide. LEWA support is always nearby.
- ISO 9001 quality management, certified by LRQA.

LEWA Oil and Gas engineering

Our experience has provided us with practical know-how in this challenging field.

We make this available to you through all phases of your project, including:

- Computerized calculation of the fluid dynamics in the pipelines
- Computerized sizing and charge pressures of pulsation dampeners
- CAD generated P & ID's, isometrics and package drawings
- Prompt integration of design changes during the project
- Detailed GA drawings and operating instructions
- Spare parts information in the form and language agreed, including sub-supplier items
- Certified welders and approved procedures
- Test procedures and equipment meeting your certifying authority specifications
- Proper conservation and packing including all lifting points required

Our clients include:

Engineering Contractors Group



Package User Group



woodside



PETROBRAS



LEWA pumps and packages have been operating for over 30 years in oil and gas industry locations around the world. Middle East or Far East, the Americas, Europe, the North Sea, or Africa ... you'll find LEWA there. Often, our pumps and packages have been in continuous operation for many years, still giving excellent service and utility ... and true customer satisfaction.

When the going gets rough and you need dependability, call on LEWA. Whether for high operating pressures ... or hard-to-handle fluid characteristics such as low viscosity, high vapor pressure, low lubricity, flammability, toxic, abrasive solids ... or in difficult ambient conditions such as the North Sea, where maintenance access can be impossible for months

at a time ... you'll find LEWA pumps and packages are the preferred choice of many users. We can meet the most stringent requirements, and international, national and local standards. We offer compact, ready-to-use packages that are a real solution to your specific application, whatever it is, wherever you are.

LEWA serves all application areas:

- Production
- Transfer (Forwarding)
- Processing
- Post-Treatment
- Pipeline

Typical services:

- Injection of:
 - Methanol
 - Glycol
 - Bentonite
 - Corrosion Inhibitors
 - Scale Inhibitors
 - Oxygen Scavengers
 - Demulsifiers
 - Pour Point Depressants
 - Flow Enhancers
 - Sedimentation Inhibitors
 - Water Treatment Chemicals
 - Polymer
 - Biocide
 - Defoamer
 - Polyelectrolyte
 - Hypochlorite
- Continuous Dilution and Injection
- Fuel Dyeing
- Gas Odorization with Mercaptan or THT
- Condensate Reinjection
- NGL and LNG Injection for LSEOR



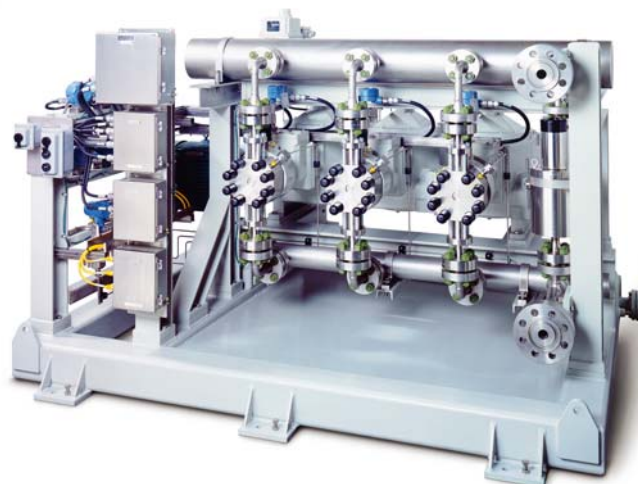
Chemical injection package for onshore Russia



Methanol injection for offshore North Sea



Chemical injection package for offshore



Glycol injection package for offshore

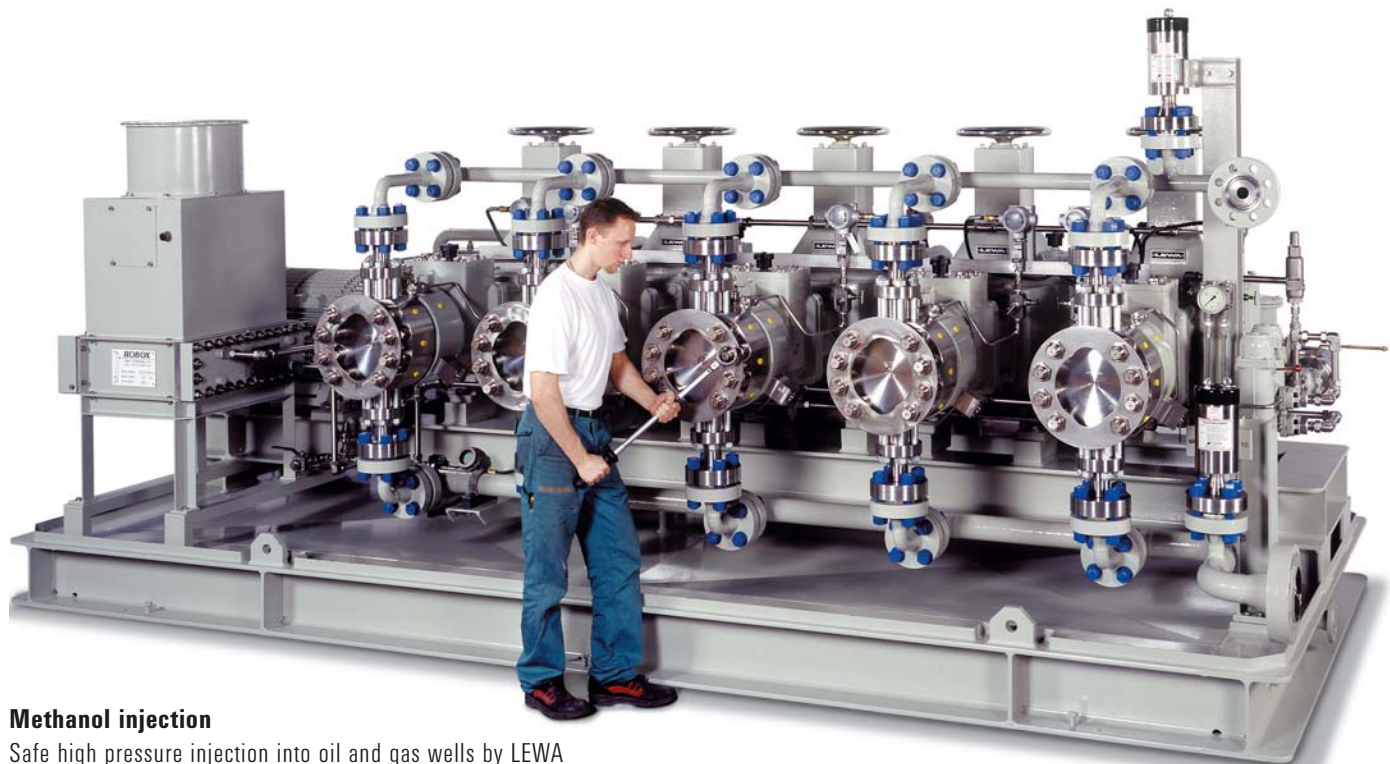
Metering packages for production, transfer and processing of crude oil and natural gas

PRODUCTION

- Conditioning of drilling mud
- Flow enhancers for crude oil
- Condensate re-injection
- Water conditioning

Glycol injection

High pressure package on common skid, complete with resonator and monitoring equipment. Onshore Norway.



Methanol injection

Safe high pressure injection into oil and gas wells by LEWA quintuplex process diaphragm pump, model EG5 offshore skid (FPSO). Pump flowrate 8.8 m³/h at 345 bar (38.75 U.S. GPH at 5004 psig)

TRANSFER (FORWARDING)

- Injection of methanol, glycol, corrosion inhibitors, scale inhibitors and oxygen scavengers
- Addition of demulsifiers and antifoam
- Metering of additives for intermediate underground storage

PROCESSING

- Addition for conditioners for the finished product
- Gas odorizing



Corrosion inhibitor injection

Compact offshore skid with rectangular 316 L single tank 1.5 m³ (396 U.S. gallons). Electric motor driven operating and stand by pump, diaphragm type. Structural base plate with

stainless steel drip pan. Explosion proof instrumentation and local control panel suit for zone 1. Flow rate 41 l/h at 350 bar (10.8 U.S. gallons/h at 5076 psig).



Chemical injection

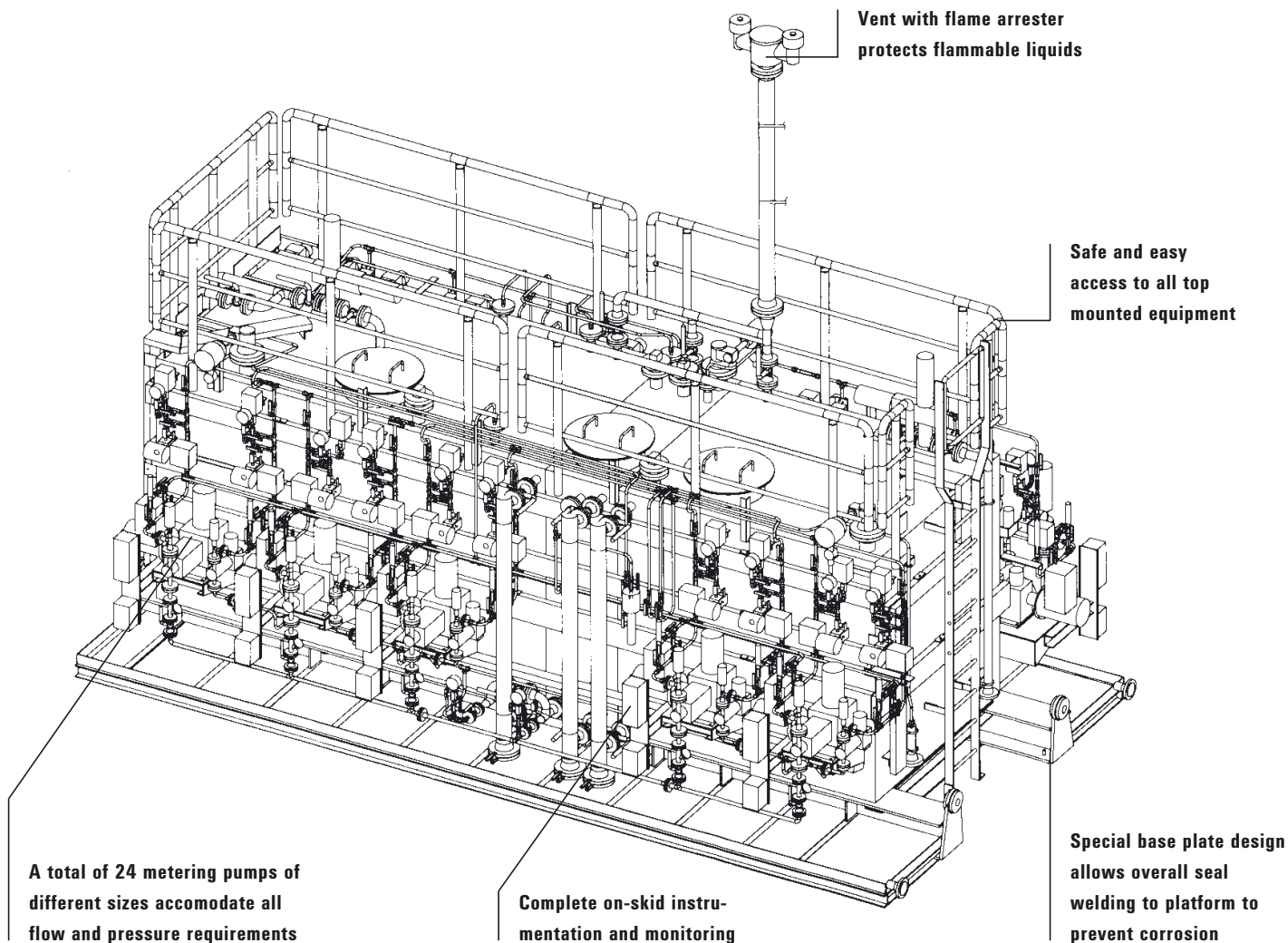
(corrosive inhibitor, demulsifier, antifoam, scale inhibitor) Compact offshore skid with rectangular multicompartiment tank for different fluids. Each compartment with electric motor driven operating and stand by pump. Structural base frame with stainless steel drip pan. Explosion proof instrumentation and junction boxes at skid edge suited for zone 1.

Offshore injection package built to fit the space available

Stringent site requirements for overall size and component location can easily be accommodated using LEWA's CAD system. The package can be designed to allow the installation of additional pumps when required. With the modular design of LEWA pumps, changing requirements during field life can be readily accomplished, e.g., the addition of remotely controlled stroke actuators, diaphragm pump heads, etc.

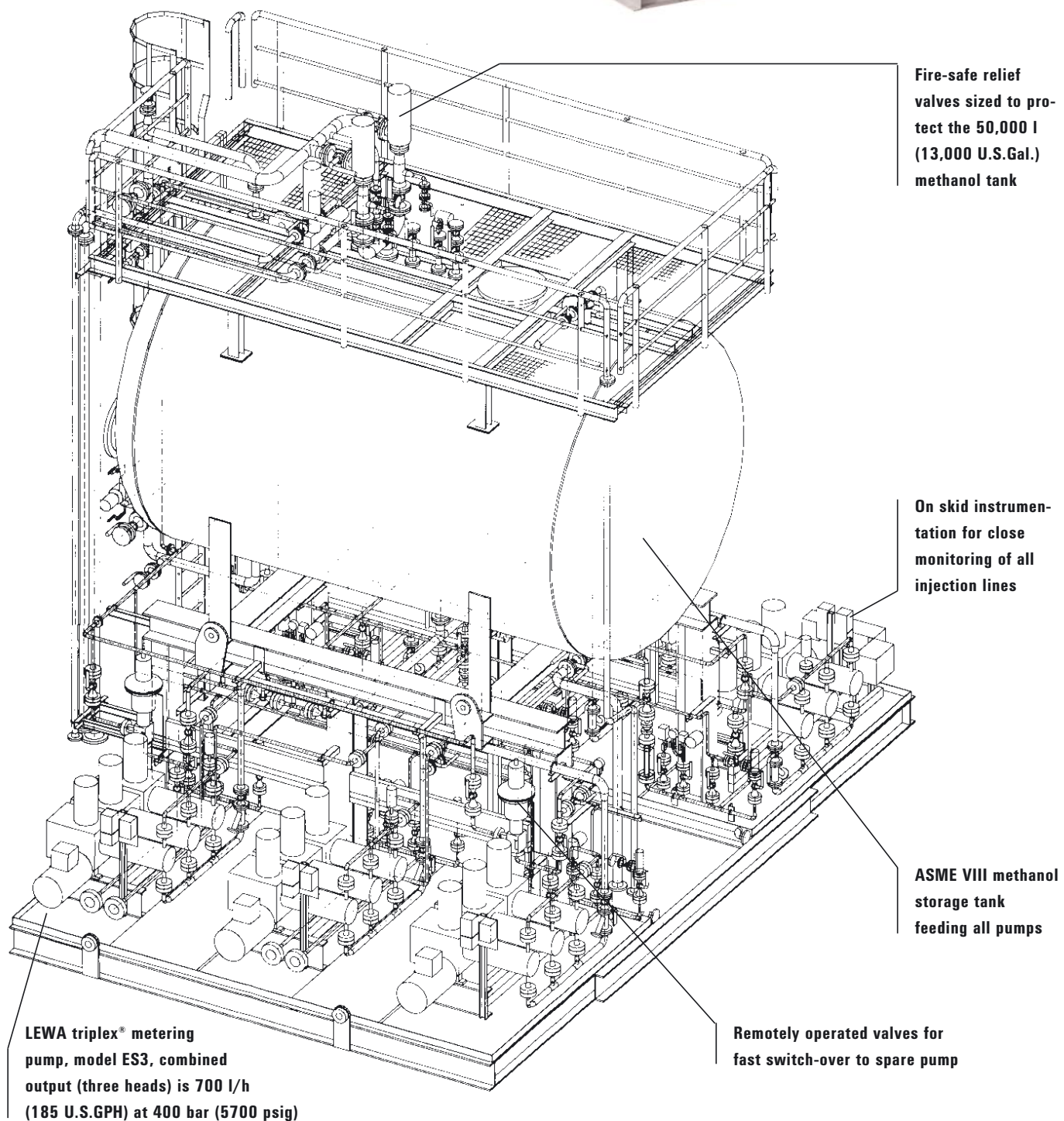
Mixing and injection

This LEWA package is for installation on an offshore platform in the Middle East. Multi-compartment tank, 2100, 7400, and 11500 liters (550, 2000, and 3035 U.S. Gallons). 24 metering pumps each with an on-line backup, completely piped including all instrumentation, all in a compact, space-saving design.



Methanol injection

This LEWA package includes 6 LEWA metering pumps integrated into the assembly. The space saving design uses minimum floorspace while still retaining adequate service access.



LEWA – standard and custom-built metering packages



Natural gas odorizing

Unit has totally enclosed housing, especially suitable for installation in residential areas. An active charcoal filter neutralizes any possible odorant leakage to the outside. Cabinet is complete isolated with heating of up to 2000 W. The control unit is direct mounted on the cabinet and is suitable for Ex-zone.

Odorizing units OD7, OD8 and OD60-1000

The units are designed for de-centralized odorization of natural gas. The leak-tight solenoid operated diaphragm pump draws directly from standard returnable odorant tanks (OD7 and OD8). A built-in reserve tank equipped with measuring burette, filter and shut-off valves allows checking of the volume remaining in the odorant supply tank, as well as verifying the function of the solenoid operated pump. With OD7 and OD8 the odorant supply tanks can be changed without interrupting odorization. The electronic control system incorporates a flow-proportional coupling of the pump stroke frequency to the flowrate of natural gas in the pipeline, with provision to upgrade capabilities by various plug-in modules for such as intrinsically safe supply of the inputs, pulse generator with adjustable pulse frequency and analog value conversion, summation of the signals coming from two gas flowmeters, closed-loop control with odorant flowmeter, etc.



Standard systems with stationary vessel (OD60-1000), modular design

- Tank size:
60 – 1000 l
(15.85 – 26417 U.S. gallons)
- Drip pan
- Pumps: 1 – 4
- Flow-meter: 1 – 4
- Options: e.g. cabinet

Solar powered metering package

Sedimentation and Corrosion Inhibitor injection

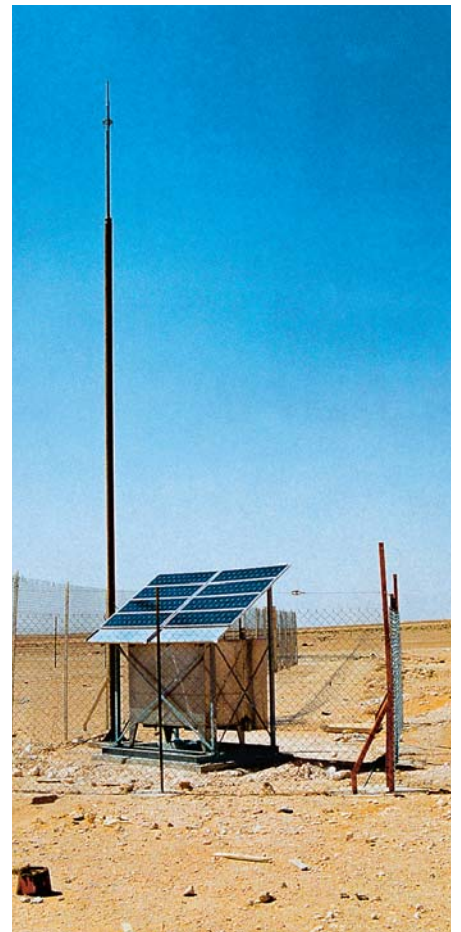
Operates totally independently from an external power supply with flowrates from 2 to 8 l/h (0.5 to 2.0 U.S. GPH).

Injection pressures depend upon the application: to 70 bar (1,000 psi) when injecting into pipelines, and frequently around 200 bar (2,900 psig) when treating at wellheads.

An extra efficient LEWA type MLM solenoid operated diaphragm pump is used for our solar powered packages. For continuous operation without supervision, an optional radio transmitter system can be added to remotely monitor the pump function.

Normal maintenance intervals are one year!

The solar powered metering system from LEWA combines many advantages: no power supply needed, operates practically service-free, can be easily dismantled, transported, and re-installed. Many different metering and injection applications can be accommodated where power-independence, mobility and low service costs are required.



LEWA – the full range of fluid metering

■ For medium to high pressures: LEWA ecoflow®

LEWA ecoflow offers the most advanced metering diaphragm pumps with leak-free safety for medium and high pressures – not least because of the unique Diaphragm Protection System (DPS).



■ For high pressures: LEWA process diaphragm pumps

The leak-free LEWA process diaphragm pumps for high flow rates are the tightness standard in high-pressure process technology. Using LEWA triplex process diaphragm pumps, even critical, toxic or flammable liquids can be conveyed safely. Even extremely low viscous, non-lubricating fluids or abrasive suspensions can be handled successfully.



■ For closed control loops: LEWA metering systems

LEWA is the first point of contact in the market for high-performance yet economically designed metering systems. These are modular combinations of pumps, valves and controls for stroke lengths and speeds, flow meters (volume or mass flow) and controllers. The metered flow is controlled in a closed control loop.



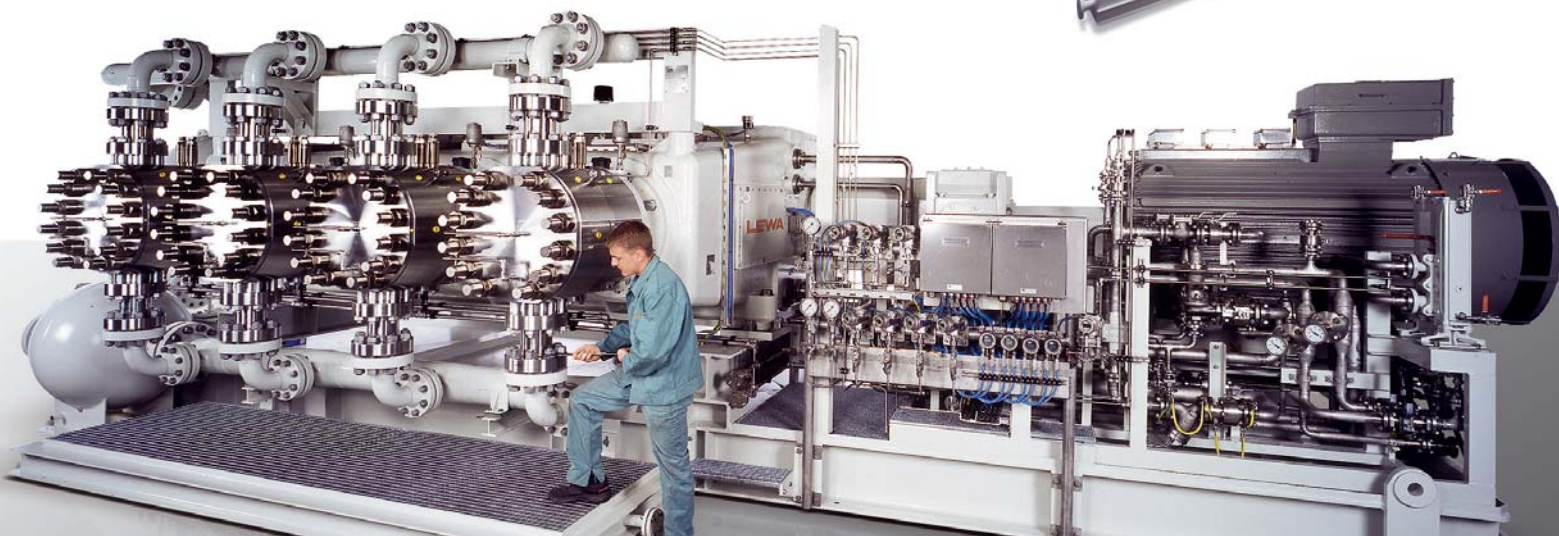
■ For process automation: LEWA metering packages

LEWA metering and mixing packages for process automation are available either as standard variants ready for connection, or designed by LEWA specifically for the task on the customer's request. LEWA can supply complete, ready to operate

problem solutions. Our services range from engineering through to commissioning – including individual package controls, process visualisation, logging of operational data and external interfaces to the process guiding system.



The world's biggest high-pressure process diaphragm pump. Reinjection of CO₂ into natural gas field Hammerfest / Norway. Pump flowrate 110 m³/h at 215 bar (29.059 U.S. GPH at 3118 psi), drive power 850 kW.



LEWA – always close to the client

LEWA service

Only comprehensive service make first class quality complete. For after-sales service, and during the complete life cycle of our products, a qualified team of engineers and service technicians is at your disposal.

The LEWA service offers:

- **Commissioning of our products and training of your operating personnel**
- **Immediate and correct supply of spare parts due to full parts identification**
- **Fast, worldwide service**
- **Service contracts with regular inspection by our qualified service personnel**
- **Training and further education of your leading personnel – at LEWA, or on-site – assure expert handling of our high quality products**

LEWA quality

Our quality guidelines:

- supply top technology worldwide
- be a sound partner for our customer



A quality management system to ISO 9001 is applied to the complete LEWA service. Lloyd's Register Quality Assurance (LRQA) has carried out the certification and monitors its adherence.

Pumps according to guidelines:
API 674 and API 675



LEWA award



LEWA has received the 2007 Frost & Sullivan Award for "Product Line Strategy for Pumps in the European Oil and gas industry."

In explaining its choice, Frost & Sullivan (F&S), a globally active business consulting firm, cited LEWA's dominant position in its market segment. With our line of pumps for high-pressure and high temperature applications, we have developed unique products that are offered in this application-oriented form by virtually no other producer in the market. According to Frost & Sullivan, LEWA has invested substantially in research and development and is expected to sustain that commitment.



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