Flüssiggas-Anlagen

One of the best assorted and largest stock of equipments of any kind destined for all industrial LPG applications within Europe. With more than 30.000 of different articles on stock, FAS has one of the widest assortments of this branch world-wide.

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Flüssiggas-Anlagen

Vaporizer Technique

FAS
Flüssiggas-Anlagen

The company FAS (Flüssiggas-Anlagen GmbH, Salzgitter) was established in 1975 as commercial enterprise for LPG equipment (propane/butane). At the end of the seventies the "safety idea" gained more and more acceptance for customers and users. Due to the legal rules and regulations FAS extended the product range "safety engineering" and included a large number of further valves, fittings and equipment into the delivery program in order to comply with the increased requirements in safety engineering of gas producers, suppliers and distributors.

Over the years new products were developed and constructed by FAS for market niches in order to be able to fulfil the increasing wishes and requirements of the customers. For this reason it was also necessary to change and to extend the production area in Salzgitter a few times so that now in the new location in Salzgitter, Peiner Straße 217, the possibility to come up to the actual market situation is given and realized.

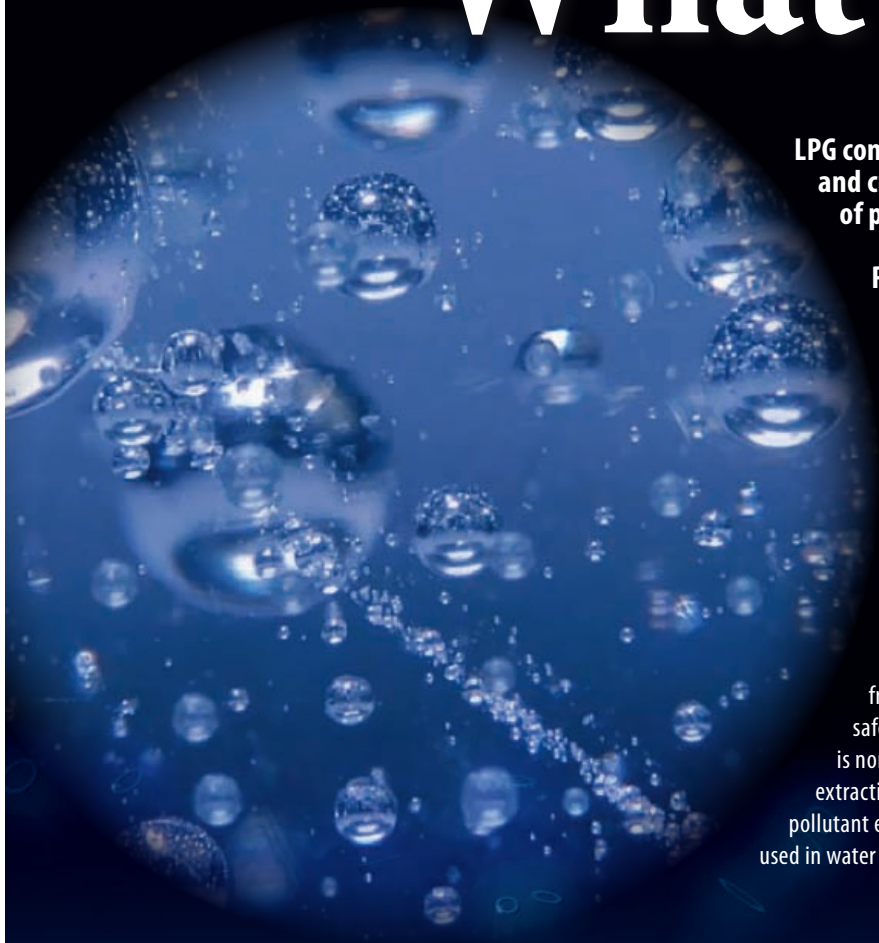
FAS modern and large-scale production facilities with a service workshop is able to produce all innovative FAS-products in highest possible quality and in a reliable manner under observation of the delivery dates. The products developed by FAS are manufactured on most modern machines by highly qualified and efficient experts and are subject to a very extensive quality securing system.

Due to the far-sighted and successful company policy FAS purposefully developed to one of the most competitive and efficient suppliers of LPG fittings and equipment for road tankers and stationary installations within Europe.

The company may fall back upon one of the best assorted and largest stock of equipments of any kind destined for all industrial LPG applications within Europe. With more than 30.000 of different articles on stock, FAS has one of the widest assortments of this branch world-wide. In the meantime FAS is represented on almost all important markets within Europe by its own sister companies, by local sales consultants or agencies.

It is our permanent endeavour to develop our products and to keep the high-quality standard so that we will be able to achieve to competitive advantage together with our customers also in future.

What is LPG?



LPG consists of hydrocarbon and is won by extraction of gas and crude oil refining. LPG is well known under the name of propane/butane.

Released energy in the narrowest area

Under the relative small excess pressure the gases are liquefied and provided in cylinders or in tanks. In this way large quantities of energy are made ready for conveyance and suitable for storage. For comparison: during vaporization of LPG the medium is extending up to 250-fold of its volume. By the way, 2001 the whole demand in Europe was covered with 60% from the gas fields directly and with 40% from refineries.

Clean and sure in practise

During withdrawal of LPG out of a pressure tank LPG is transformed from liquid phase into gaseous phase and by means of regulators- and safety equipment it arrives at the consumer plant. LPG burns cleanly, it is non-poisonous and thus it is one of the latest forms of energy. From the extraction of LPG up to customer plant there are neither conversion losses nor pollutant emissions in the closed system. Because of its cleanliness, LPG can be used in water protection areas.

Liquid Gas for Industrial Application

In the industrial and commercial areas liquid petroleum gas is frequently used for heating of halls and as process gas for various applications. As for this purpose very often large quantities of liquid gas are required during a very short period of time and the capacity of vaporizing process of the tank only is not sufficient, liquid gas vaporizers are used for transforming LPG from its liquid phase into gaseous phase.

Vaporizing capacities (natural vaporizing) aboveground tanks

Content of tank, kg	For annual consumption, kg	Short time unloading, kg/h (summer/winter)	Periodical unloading, kg/h (summer/winter)	Permanent unloading, kg/h (summer/winter)
800	1600	22,5/4,5	13/2,5	10,0/2,0
1200	2400	35,0/7,0	14/3,0	11,0/2,2
2000	4000	65,0/13,0	25/5,0	18,0/3,5
4000	8000	107,5/21,5	45/9,0	30,0/6,0
5000	10000	155,0/31,0	67/13,5	36,0/7,0
5600	12000	170,0/34,0	72/14,5	38,0/7,5
7500	15000	200,0/40,0	80/16,0	42,0/8,5

Vaporizing capacities (natural vaporizing) underground tanks

Content of tank, kg	For annual consumption, kg	Short time unloading, kg/h	Periodical unloading, kg/h	Permanent unloading, kg/h
800	1600	15,0	6,0	6,0
1200	2400	42,5	8,0	6,5
2000	4000	75,0	15,0	11,5
4000	8000	100,0	20,0	15,5
5000	10000	125,0	26,0	18,0
5600	12000	215,0	43,0	23,0
7500	15000	255,0	48,0	25,0

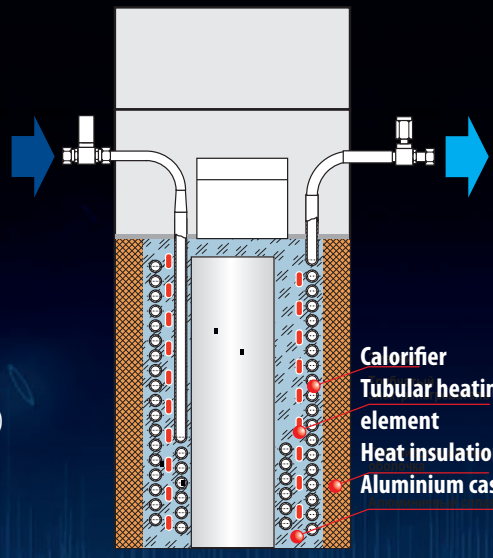
FAS 2000

Dry-type Vaporizer - Capacity 15 kg/h & 40 kg/h
Voltage 230 V / 50 - 60 Hz

The vaporizer units FAS 2000-15 and FAS 2000-40 offer a safe and reliable energy supply with low capacities required. They are used in installations with small tanks and with a low natural vaporization. Vaporizer systems FAS 2000 grant a continuous operation of gas supply without interruption.

Characteristics:

- Capacity: 15 kg/h / 40 kg/h
- Consumption:
  vaporizer 15 kg/h: 3,2 kW (230 V A.C., 50-60 Hz,14 A)
  vaporizer 40 kg/h: 4,4 kW (230 V A.C., 50-60 Hz,20 A)
- Max. pressure: 25 bar
- Independency of gas mixture (propane, butane or propane-butane mixture)
- 2-stage safety redundant system
  (2 solenoid valves in connection with internal temperature sensor)
- Plug-in version ready for connection



Schematic drawing

Indirectly Electrically Heated Dry-type Vaporizer, type FAS 2000

Capacity 32 to 620 kg/h
Voltage 400 V / 50 - 60 Hz

Single vaporizer

The FAS dry-type vaporizers are completely maintenance-free and require no heat transfer fluid. An aluminium core installed in the heating equipment is used as heat transferring medium.

Using a thermostat, the heat transferring medium is heated and monitored within the limits specified by DIN standards. Once the required vaporizer temperature has been reached, the solenoid valves open. Liquid gas enter the vaporizer where it is converted to vapour without any fluctuations in pressure until the specified rated capacity has been reached.

The modern design means that fluctuations in vapour flow are detected immediately and the required heating capacity is ad-justed quickly to suit the new operation parameters. In case of power failure or overload the solenoid valves close. An additional safety limit switch monitors the outlet temperature of the vapour and prevents it from exceeding the given limit.

Complete cabinet unit

Certified according to Pressure Equipment Directive 97/23/EC and to ISO 9001:2008

Liquid gas vaporizers FAS 2000 are available with a required capacity in two versions: as a single vaporizer or as a complete cabinet unit. The single vaporizer consists of one vaporizer ready for connection and can be used as an additional element in the existing units.

The complete vaporizer unit in cabinet construction is equipped with all necessary components such as shut off valve, control valve, safety equipment completely installed in one cabinet. This unit can be equipped with required regulators or regulator units with an outlet pressure suitable for energy generator in accordance with the particular specification of the object

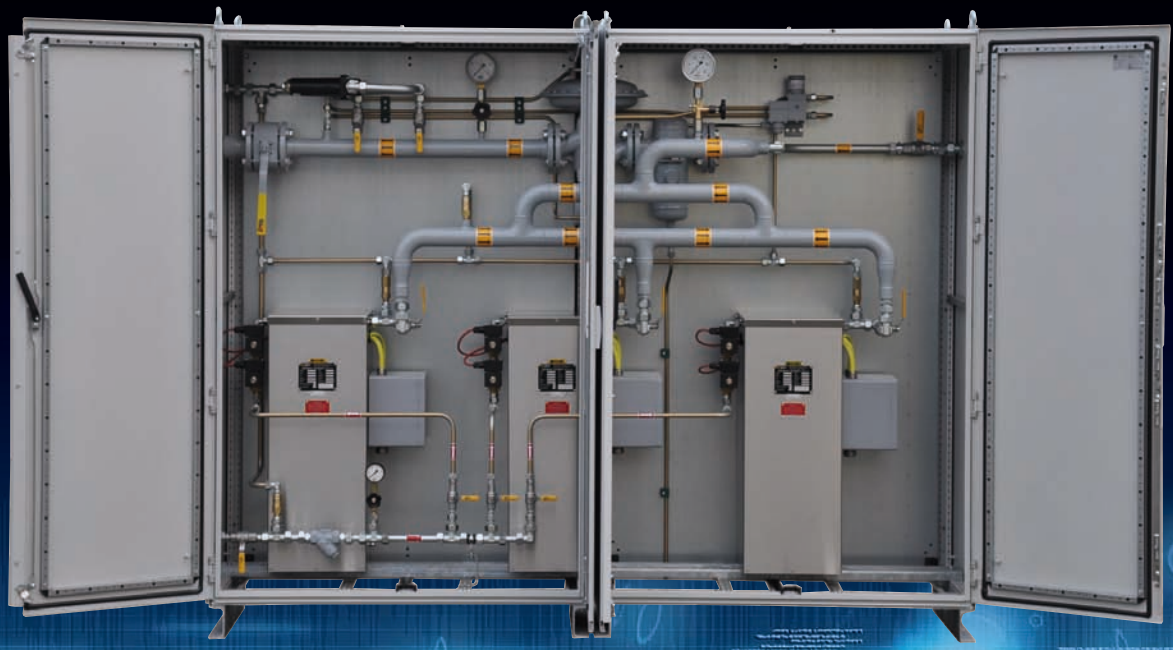
The standard execution is equipped with a regulator with an outlet pressure of 1,5 bar (middle pressure) to 50 mbar (low pressure). The safety shut off valves and /or the safety relief valves are installed as safety equipment depending on execution of regulatur. They are adjusted to the requested outlet pressure and tested.

FAS 2000 complete vaporizer unit — capacity table

Vaporizer Type	Capacity kg/hr	Voltage	Connecting Power kW	Dimensions mm	Outlet pressure mbar
FAS 2000-32	32	400 V/ 50 - 60 Hz	6	1200 x 800 x 400	50 - 300
FAS 2000-60	60		12	1200 x 1200 x 400	
FAS 2000-100	100		18	1600 x 1200 x 500	
FAS 2000-170	170		24		
FAS 2000-330	330		48	1600 x 1200 x 600	
FAS 2000-450	450		72	2400 x 1800 x 600	
FAS 2000-620	620		96		

Example:
Complete vaporizer unit FAS 2000
with outlet pressure 50 mbar

1. **Vaporizer FAS 2000**
2. **Liquid trap**
3. **Regulator unit - Pre-stage P_a=1,5bar**
4. **Regulator unit - P_a=50 mbar**
5. **Terminal box**
6. **Solenoid valve**
7. **Fine mesh filter**
8. **Shut off valve**

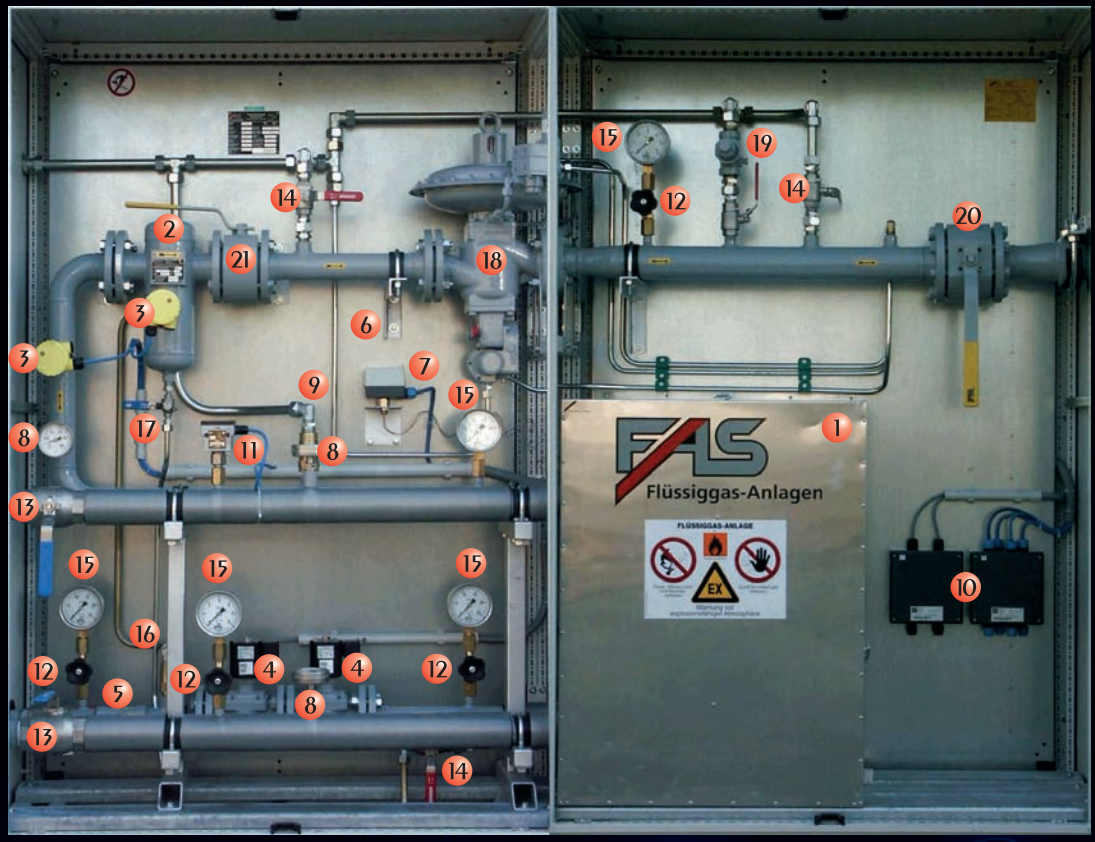


FAS 3000

Hot Water Heated Vaporizer Unit

FAS 3000 complete vaporizer unit - capacity table

FAS number	Capacity kg/hour	Outlet pressure mbar
20 247	400–800	without regulator unit
20 246	1000–1200	
20 245	1500–1900	
20 229	up 4000	
20 249	up 7000	
20 250	up 12 000	
20 248	400–800	20–2100
20 2481	400–800	5–5000
93 065	1000–1200	
93 073	1500–1900	
93 153	up 4000	
93 074	up 7000	
93 075	up 14000	



Example:
Complete hot water vaporizer unit FAS 3000 (capacity – 1200 kg/hour)

1. Hot water vaporizer FAS 3000
2. Liquid gas trap
3. Liquid level sensor
4. Solenoid valve
5. Fine mesh filter
6. Thermoelement
7. Double temperature controller
8. Temperature sensor
9. Safety relief valve
10. Terminal box
11. Pressure sensor
12. Gauge valve
13. Ball valve
14. Ball valve
15. Pressure gauge
16. Safety relief valve
17. Ball valve
18. Pressure regulator
19. Differential pressure valve
20. Ball valve
21. Ball valve
22. Pressure gauge

TÜV SÜD ISO 9001

Certified according to Pressure Equipment Directive 97/23/EC and to ISO 9001:2008

Examples of installations of vaporizer units

Propane-Air Technology

FAS 4000

Propane-Air Mixing Unit

Mixing units FAS 4000 are availabe in two versions and may be constructed with capacities required according to customer specification.

In case of peak supplies, e.g. in very cold winters, the natural gas supply system may be faced with supply problems to be sorted out. One reason is that the peak loads may not be supplied due to the very strong demand and this situation may lead to interruptions in production. Further the costs for the natural gas supply in situation of high demand often increase due to the agreements made for graduated prices.

For the compensation of such peak loads a propane-air-mixture may be feeded into the natural gas supply system. For this purpose a propane-air mixing unit, e.g. type FAS 4000, may be used.

Mixing units produce a LPG-air-mixture with a constant capacity and quality. This mixture is used as exchange gas for natural gas.

Mixing units FAS 4000 are available in two different versions:

- **as low pressure unit - LP,**
- **as high pressure unit - HP.**

Low pressure units are normally produced for systems with an outlet pressure not higher than 500 mbar and they are executed as a cabinet version. High pressure units with automatic regulation of calorific value of the gas-air-mixture depend on the operation considitons at customer site. They are designed and manufactured according to customer requirements and specification.

FAS 4000 complete mixing unit - capacity table

Type of mixing unit	Capacity, m³ (propane/air mixture) kg/hour	Inlet/Outlet LPG	Inlet/ Outlet pressure, mbar
FAS 4000-32 ND	30/30	DN15/DN50	2000-5000/bis 500
FAS 4000-60 ND	50/60	DN15/DN50	2000-5000/bis 500
FAS 4000-100 ND	80/100	DN20/DN65	2000-5000/bis 500
FAS 4000-160 ND	130/160	DN25/DN65	2000-5000/bis 500
FAS 4000-300 ND	240/300	DN25/DN65	2000-5000/bis 500

Examples of mixing units

Certified according to Pressure Equipment Directive 97/23/EC and to ISO 9001:2008