

**MAKEEN**  
ENERGY

# FAS LPG Vaporizer Technology

Versatility - Performance - Durability

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In industrial and commercial areas, you often need to draw large quantities of gas from your tank within a very short time. FAS' dry-type LPG vaporizers ensure the gas supply by transforming the liquid gas into its gaseous phase.

The FAS dry LPG vaporizer operates without transfer fluid. An aluminum core, in which the heating and vaporizer coils are cast, serves as the heat carrier.

The heat transfer medium is heated and monitored under thermostat control. After reaching the required evaporation temperature, the solenoid valves open. Liquefied gas enters the vaporizer and is converted into the gas phase without pressure change up to the specified rated output. The energy-efficient design quickly adjusts the required heating output according to the consumption rate.

In case of fluctuations and power failure, the solenoid valves close. An additional safety temperature limiter monitors and prevents an excessively high rise in the gas exit temperature.

When installing this LPG vaporizer outdoors, a protective roof is required (provided by the customer).

### Vaporizer specifications

The vaporizer comes in capacities of 15 kg/hr (4 gal/hr), 25 kg/hr (6.5 gal/hr) and 40 kg/hr (10.5 gal/hr) as a single phase 120V - 240V/50Hz - 60Hz version and in 32 kg/hr (8.5 gal/hr), 60 kg/hr (16 gal/hr), 100 kg/hr (26.5 gal/hr) and 170 kg/hr (45 gal/hr) as a three phase 400V/50Hz - 60Hz version. It is indirectly heated and designed for the use within Ex-zone 2. It is pre-wired and ready for connection (optional version).

FAS Vaporizer in capacity 15 kg/hr (4 gal/hr), 25 kg/hr (6.5 gal/hr) and 40 kg/hr (10.5 gal/hr) as a single phase 120V-240V/50Hz-60Hz.\*



### FAS 2000, PN25

#### Vaporizer casing

Stainless steel construction with an internal aluminum core, intermediate insulation, protective cover and wall bracket for vaporizer up to 40 kg/hr.

#### Heating coil

Resistance heater element, casted together with the LPG coil into the aluminum core as a tubular heater.

#### Safety valve

In the gas phase:

- Set pressure 25 bar
- Without condensate drilling
- Component-tested

#### Temperature control

Fully automatic, thermostat-controlled within the specified limits.

#### Flood protection/low-temperature safeguard

Consists of two redundant thermostat-controlled solenoid valves.

#### Overheat protection

With safety shutdown.

#### Electrical equipment

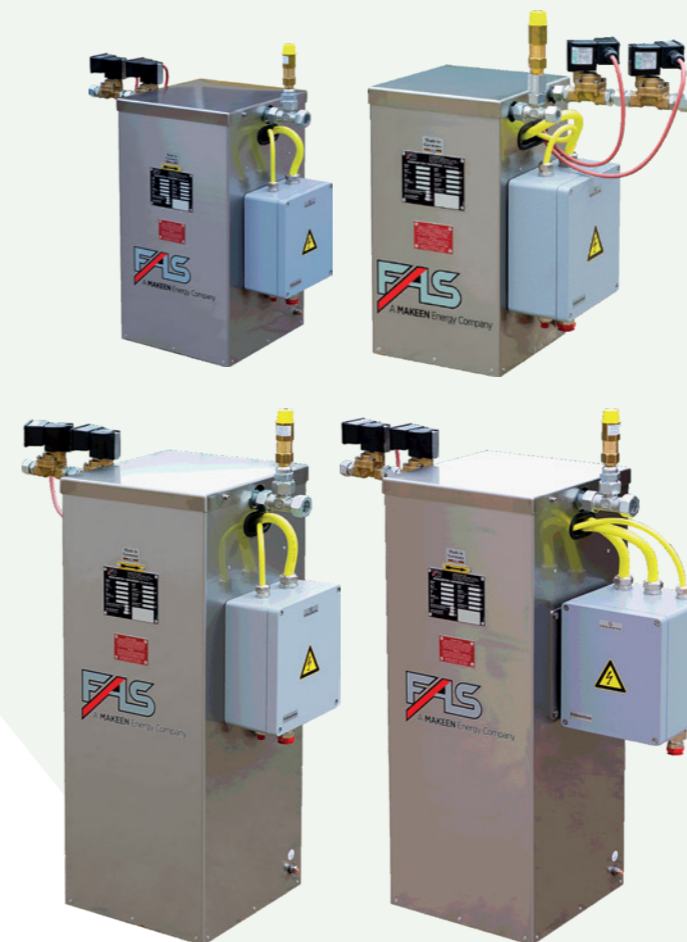
According to IEC 60079-0/IEC 60079-15  
Ex-Zone 2, Type of protection: Ex II 3G Ex nR IIB T4 Gc



### Dry-type vaporizer FAS 2000

The indirectly electrically heated dry-type vaporizers FAS 2000 in stainless steel housing offer a safe and reliable energy supply for applications with low capacity requirements.

These maintenance-free vaporizers are used in installations with small tanks with a low natural vaporization. FAS 2000 vaporizer systems grant a continuous operation of gas supply without interruption. They are suitable for use in hazardous areas, zone 2.



#### FAS 2000 Vaporizers

Three-phase vaporizers with 60 kg/hr (16 gal/hr), 100 kg/hr (26.5 gal/hr), and 170 kg/hr (45 gal/hr) with two redundant solenoid valves each.\*

### Industrial vaporizer FAS 2000i

Thermostatically controlled vaporizers with external power control offer the possibility to set working temperature ranges and data transmission. Control is achieved via an external control cabinet or by integration into a system control.

#### Advantages:

- Precise temperature control via external control, can be integrated into the control system of the entire plant
- Data transmission/evaluation

#### Performance features:

- Power classes: 32 kg/hr (8.5 gal/hr), 60 kg/hr (16 gal/hr), 100 kg/hr (26.5 gal/hr), and 170 kg/hr (45 gal/hr)
- Available as a freestanding single vaporizer and as a vaporizer system
- Control as an external control cabinet or on a mounting plate



### Vaporizer FAS 2000 with position indicator

Thermostatically controlled vaporizers with solenoid valves with electrical position indicators allow for operation monitoring, as the solenoid valves close in case of failure, as well as when temperatures exceed or fall below set limits.

#### Advantages:

Automatic operation monitoring



### Vaporizer units with dry-type vaporizer FAS 2000

The FAS dry-type vaporizers FAS 2000 are available as compact unit including all required components such as shut off valves, control valves, safety equipment, pressure regulators set to the requested outlet pressure. All vaporizer units are designed according to customer specification and can be delivered either in cabinet design, in a container or as a compact skid unit including storage tank.

Image right: FAS Vaporizer unit in cabinet construction. Version with single vaporizer max. total capacity 170 kg/hr (45 gal/hr).



Capacity, kg/hr (gal/hr)	Voltage	Power rating, kW	Dimensions of cabinet, mm**	Output pressure***
15 (4)	110-120V / 220-240V 50Hz-60Hz single-phase	4.4	1200 x 800 x 400	50 mbar / 0.5-2.5
25 (6.5)		5.6		
40 (10.5)		6.0		
32 (8.5)	400V 50Hz-60Hz three-phase	12.0	1200 x 1200 x 400	
60 (16)		18.0	1600 x 1200 x 400	
100 (26.5)		24.0		
170 (45)				

\*\* Dimensions may vary. \*\*\* Output pressure depends on the regulator setting.



If needed, higher capacities can be achieved by using parallel circuits of the same size. The standard versions are equipped with medium pressure regulators with an output pressure of 0.8 bar to 1.5 bar and accordingly adjusted safety devices (OPSO and PRV), optionally with a low-pressure control section and bypass.

Image left: Version with multiple FAS vaporizers – 2 to 4 pcs. of size 100 kg/hr (26.5 gal/hr) or 170 kg/hr (45 gal/hr). Max. total capacity 620 kg/hr (164 gal/hr) (4 pcs. of size 170 kg/hr (45 gal/hr)).\*

### Vaporizer compact skid unit including storage tank – a “Plug & Play” solution

The vaporizer system in a cabinet construction can also be equipped with a storage tank and delivered mounted on a galvanized base frame, piped, primed, and painted.

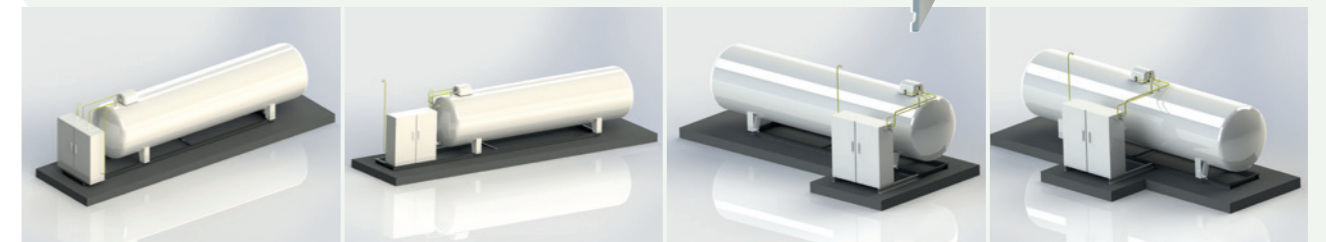
#### Advantages:

- Storage tank capacity according to customer request
- Compact unit mounted on a galvanized base frame
- Different arrangements of vaporizer cabinets available on request

- Factory pre-assembly of the compact unit
- Low on-site installation costs due to the elimination of the complex installation of the liquid phase line
- Flexibly deployable at different locations
- Compact unit with CE marking and factory acceptance

#### Performance features:

- Storage tank 2.1 tonnes and 2.9 tonnes
- Vaporizers 15 kg/hr-100 kg/hr (4 gal/hr-26.5 gal/hr)
- Bypass line of the regulated gas phase
- Excess flow valve in the liquid phase line
- Connected cable for electrical supply
- Blow-off line for safety valve of vaporizer



End-face

Side-by-side

Right-side

Centrally located

## Vaporizer system FAS 2000 in container

If higher capacities are desired, the vaporizer system in the container version is the suitable variant. The execution is according to customer specifications.



Installation in a 10-foot steel container with a total capacity up to 1250 kg/hr (330 gal/hr), 8 pcs. of 170 kg/hr (45 gal/hr).\*

## Hot water-heated vaporizer unit FAS 3000

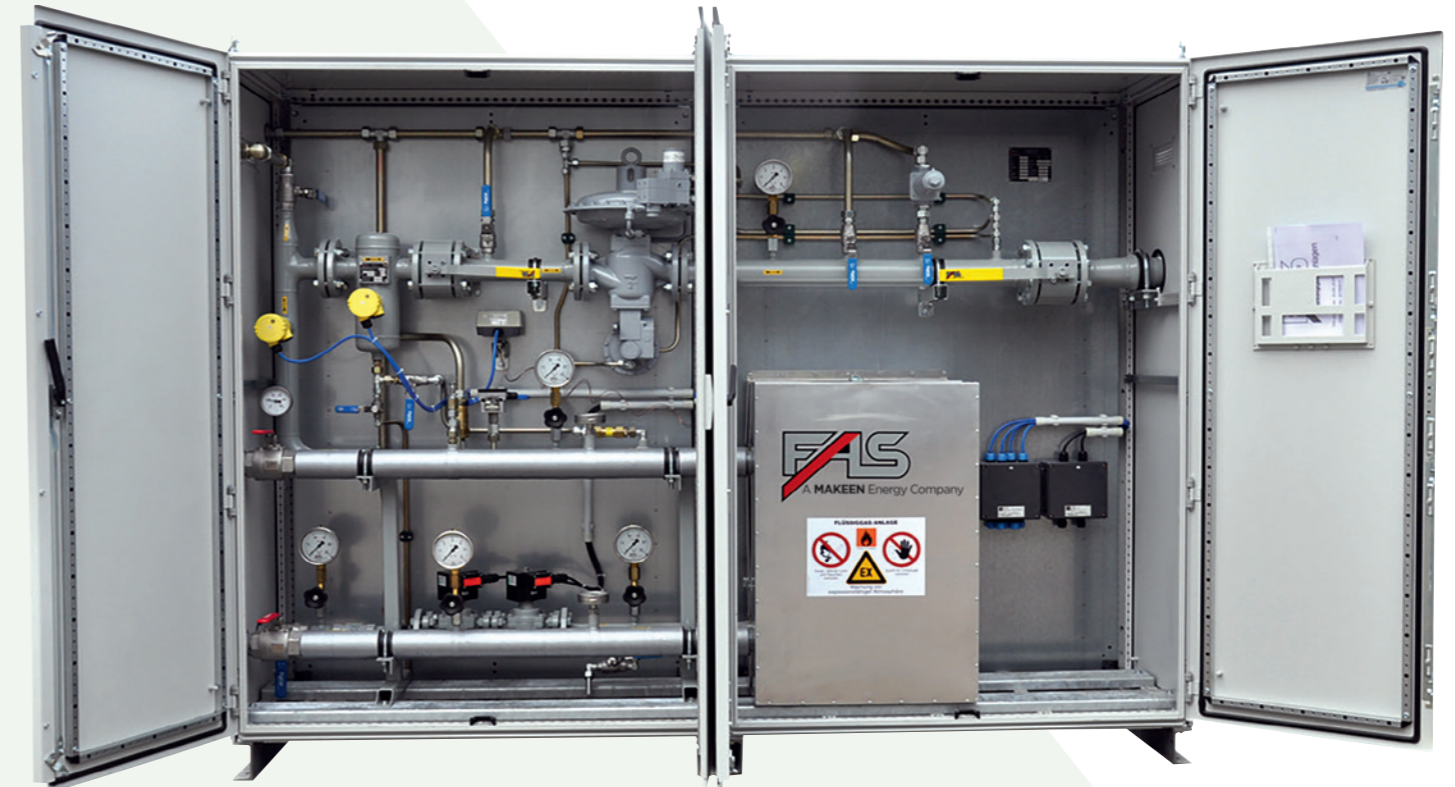
Especially in case of increased capacities, the operation costs may be reduced significantly with the use of Hot water-heated vaporizers working with plate heat exchangers.

These compact vaporizer units include all required components such as shut off valves, control valves, solenoid valves, safety equipment, thermometers, liquid level sensors, pressure regulators. The vaporizer units are completely mounted in a cabinet or in a container including piping. They are suitable for use in hazardous areas, zone 1. Hot water supply is usually provided on site.

- Plate heat exchanger technology
- Capacity up to 20,000 kg/hr (5250 gal/hr)
- Power supply: 120V-240V/50Hz-60Hz



Industrial redundant vaporizer unit combining hot water heated vaporizers FAS 3000 for high capacities in a 20 feet container solution.\*



1200 kg/hr (320 gal/hr) hot water-heated vaporizer unit in a cabinet with insulated water pipes, liquid trap, electronic level alarms, two stage pressure regulation and over pressure protection with safe gas release.\*

## Vaporizer system FAS 3000 in container - special execution

The vaporizer system is completely installed in a 20-foot steel container with 2 doors and a gas-tight partition wall. The compact unit consists of the hot water vaporizer system FAS 3000, the heating centre for the hot water supply of the vaporizer system, the tank system, and the electrical control cabinet. According to customer requirements, various vaporizer sizes including gas pressure control sections are available on request.

### Advantages:

- Flexible installation independent of existing infrastructure
- Factory pre-assembly of the container system including piping, pre-wiring, testing
- Low installation costs on site
- Low heat losses of the heating circuit
- Design, approval process, delivery, and installation from a single source



Container version with tank system, heating centre, and electrical control cabinet, connection voltage 230 V/50 Hz, max. total capacity 400 kg/hr (210 gal/hr).\*

# MAKEEN ENERGY

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## MAKEEN Gas Equipment

(formerly KC ProSupply) offers a wide range of high-quality gas equipment and components along with expert guidance from the beginning to the end of your project. In that way, our one-stop shop philosophy – and many warehouses around the world – provides you with much more than just a product.

**MAKEEN Energy** is a global, market-leading corporation that delivers equipment, solutions and services to the energy industry. We employ approx. 3,900 people across 6 continents and operate in over 140 countries. With our global reach, local presence and decades of experience, we can deliver responsible solutions that make a difference to people and planet.

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