

# Sampling system fleXampler standard



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## Operating Instructions

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## **1 General**

### **1.1 Introduction**

The Pfaudler fleXampler standard sampling system may only be **installed** and **serviced** by authorized technical personnel in machine/plant construction and in strict compliance with the present instructions as well as the valid standards and provisions.

The sampling system may only be operated by authorized, experienced and properly trained technical personnel in strict compliance with the present instructions as well as the valid standards and provisions.

The failure to observe these instructions – no matter whether intentionally or negligently – releases the manufacturer from all liability and warranty claims.

The present Operating Instructions are designed to familiarize users with the equipment of the Pfaudler fleXampler standard sampling system and its use. The operating instructions should be available to the operating and maintenance personnel and should be read prior to sampling and to any assembly and maintenance work.

By knowing the present operating instructions, you can avoid damages to the sampling system and prevent risks to personnel, machines, and the environment.

The figures and data contained in the present operating instructions are subject to change and further development. The latest edition will always supersede all previous ones.

### **1.2 Scope**

The Pfaudler fleXampler standard sampling system serves to obtain representative product samples from a reactor quickly and safely.

## **2 Safety**

The safety instructions refer exclusively to the scope of delivery. Please also note the safety instructions valid for your reactor/system and the products contained in the reactor.

### **2.1 Warnings and symbols**

In the operating instructions, the danger symbol is used to draw your attention to especially important information.



**Compliance with these mandatory instructions helps to avoid personal injury and damage to property.**

### **2.2 Safety instructions**



**Please note the following instructions:**

- **Do not practice any working methods which may endanger safety.**
- **In the case of malfunctions, the reactor/system shall be immediately stopped and protected against unauthorized restart! Malfunctions shall be immediately corrected!**
- **Hot system elements need to be protected against accidental contact.**
- **In order to avoid unanticipated risks, do not change any parts or components of the sampling system supplied on your own account.**
- **Ensure a safe, environmentally sound disposal of replacement parts in accordance with the valid regulations.**
- **PTFE or fluoro-carbon caoutchouk may never be burnt or ignited because they produce highly toxic vapours. If fluoro-carbon caoutchouk was nevertheless burnt, you have to wear protective gloves because of the possible presence of hydrofluoric acid. Please note that hydrofluoric acid attacks glasslined surfaces very strongly.**

## **3 Transport and storage**

The sampling system should be transported and stored in its closed original packaging.

When the sampling system has been attached to a reactor, please ensure that the system is not damaged when transporting the reactor. The sampling system must not be used to attach hosting equipment for transporting the reactor or the dip pipe/Quatro-Pipe.

In order to ensure an as-new condition of the sampling system, the following storage conditions should be maintained:

- dry and dust-free
- steady temperature and ventilation
- protection against direct influences of heat and ultra-violet light
- the fluoro and perfluoro elastomers require replacement after 60 months.
- for more information concerning the storage of elastomers, reference is made to ISO 2230.

When used sampling systems or any parts of it are sent to the manufacturer or third parties for repair or other purposes, all parts must be cleaned and decontaminated. Appropriate safety instructions for further handling must be attached to the outside of the packaging.



**Do not allow any preservatives or detergents to attack the elastomers.**

## 4 Description of the sampling system

### 4.1 Structural design

The Pfaudler fleXampler standard sampling system made by Pfaudler basically consists of the following components:

- 1 Vacuum valve
- 2 Upper flange
- 3 Sight glass
- 4 Main valve
- 5 Lower flange
- 6 Flange connection
- 7 Vent valve
- 8 By-Pass
- 9 Drain valve
- 10 Sampling flask
- 11 Suction tube
- 13 Vacuum coupling

The Pfaudler fleXampler standard sampling system is a modular product. The actual design of your sampling system may differ from the general construction shown above. Please refer to the assembly drawing for the actual construction.

### 4.2 Method of functioning

The Pfaudler fleXampler standard sampling system provides for sampling from a process vessel, such as storage tanks or reactors. All surfaces that get in contact with the medium are coated with PFA or PTFE/TFM and thus offer high chemical resistance.

The Pfaudler fleXampler standard sampling system is operated manually. By operating the individual valves one by one as described in Section 6 of the present operating instructions, samples can be taken safely right from the process.

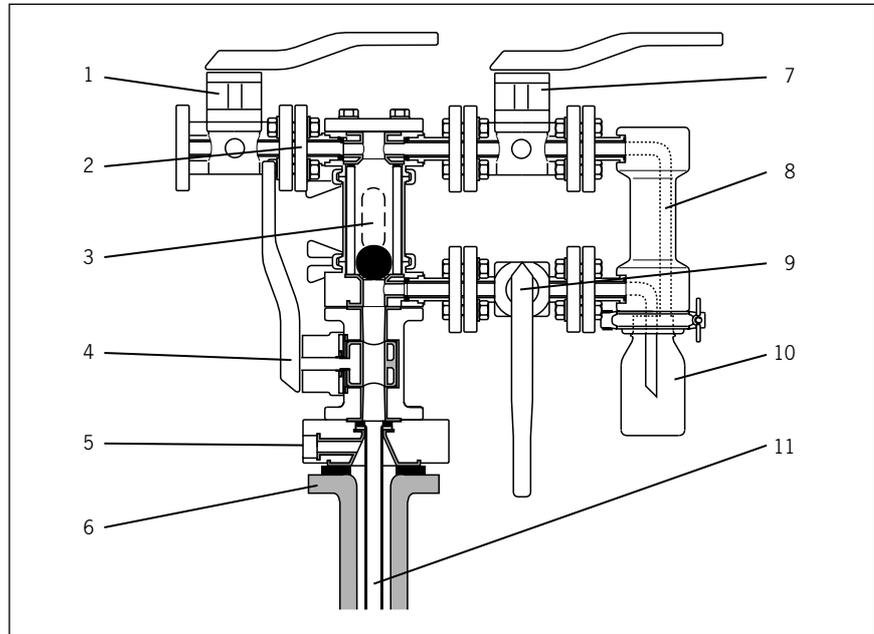


Figure 1 Pfaudler fleXampler standard

### 4.3 Operating conditions

**Maximum pressure at the main valve (item 4) of the sampling system:  $-1/+16$  bar.**

**Maximum pressure inside the reactor during sampling:  $-1/+10$  bar.**

Please make sure that the maximum pressure inside the reactor is below this limit value while sampling. For the maximum reactor pressure please refer to the reactor's nameplate.

**Temperature range while the reactor is in operation:  $-40/+200$  °C.**

Please note that the temperature limits of the reactors may differ from those valid for the sampling system. The data indicated on the reactor nameplate are mandatory.

**Product temperatures during sampling:  $-40/+200$  °C.**

**Chemical resistance:** Prior to start-up, it must be ensured that the coated components of the Pfaudler fleXampler standard are not attacked by the fluid to be sampled, and that the material is chemically resistant to the process conditions and while taking the sample.



**Please note the maximum permitted pressure and temperature values of the sampling system! Non-compliance may result in hazards for the operator and for the environment.**

**Sampling hot/cold product may result in a strong temperature rise/fall on the components of the sampling system. Please take appropriate protective measures to avoid injuries.**

## 5 Erection/Installation

### 5.1 Preparation for assembly

- Check the items delivered for completeness.
- Check all components, hoses, and screwed connections for damages.

### 5.2 Assembly



**Check whether the sealing surfaces of the lower flange on the sampling system are in a proper condition.**

Assemble the sampling system as shown on the assembly drawing and according to the following steps:

- Place gasket on the flange of the dip pipe/Quatro-Pipe (part number 027 1053).
- Insert the suction tube into the dip pipe/Quatro-Pipe. Caution: Be careful not to damage the glassed surfaces of the dip pipe/Quatro-Pipe.
- Approx. 50 mm of the suction tube must be visible at the lower end of the dip pipe/Quatro-Pipe. Cut the suction tube to size using a sharp knife. Make sure that the glassed surfaces of the dip pipe/Quatro-Pipe do not get damaged.
- Place the sampling system on the nozzle of the dip pipe and fix it with the help of the screwed flange connection. Please note the maximum flange tightening torque of 30 Nm.
- Connect the Pfaudler fleXampler standard sampling system to the supply lines (vacuum coupling, rinsing port, if necessary).

After installation, check all cables, hoses, and screwed connections for:

- proper installation and assembly
- correct connection (no confusion), cf. assembly drawing.
- tightness and damages

### 5.3 Testing the sampling system

Before finally starting up the sampling system, we recommend checking the function and tightness of all components by sampling product under operating conditions, however, using a non-critical medium, for example, in the course of the leakage test using water.

### 5.4 Removal

The removal of the sampling system is performed in analogy to the assembly in reverse order.



- **Prior to any works, the machine/system should have come to a stop and should be protected against unintentional restart.**
- **If the reactor and/or the sampling system had been operated with toxic or hazardous substances, make sure that there is no danger to the assembly and operating personnel.**
- **De-pressurize the sealed space or reactor before removing the sampling system**

## 6 Operation

Operation of the Pfaudler fleXampler standard sampling system is **in any case** subject to the steps described below.



**Diverging from the prescribed procedure may cause risks to persons, plants, and the environment.**

## 6.1 Preparation for sampling

### Take personal protective measures:

If the sample to be taken may involve a risk to persons, the plant or the environment, it is absolutely necessary to wear suitable protective equipment, such as protective gloves, aprons, and goggles.



- **Wear protective gloves to protect your hands against burns or contact with the hazardous substance.**
- **Wear an apron to protect yourself against splashes.**
- **Wear goggles to protect your eyes against splashes.**
- **Furthermore, you should observe your company's safety and protection rules as regards sampling during live processes.**

### Preparing the sampling system:

- ▼ Make sure that all valves of the sampling system are in their home position as shown in Figure 2.
- ▼ Check the sampling flask to be used for damages, such as broken threads, deep scratches, cracks and defects in the glass, etc. If the flask is damaged, it may not be used by any means. Dispose of the flask safely!
- ▼ Screw the sampling flask provided to the thread intended for this purpose.
- ▼ Make sure that the sampling flask sits safely and firmly on the thread.

Take the sample according to the steps described below.

### 6.2 Sampling under vacuum

- ▼ Slowly open main valve (Fig. 3, item 4).
- ▼ Slowly open secondary valve (Fig. 3, item 1) at the upper flange. The vacuum transports the liquid medium to the sight glass through the main valve and the suction tube inside the dip pipe.
- ▼ The hollow ball made of PTFE (Fig. 3, item 12) floats on the rising liquid level until it interrupts the vacuum line in the ball seat.

- ▼ Slowly close main valve (Fig. 4, item 4).
- ▼ Slowly close vacuum valve (Fig. 4, item 1).
- ▼ Slowly open vent valve (Fig. 4, item 7).
- ▼ Slowly open discharge valve (Fig. 4, item 9).
- ▼ Sample flows into the sampling flask (Fig. 4, item 10). The “residual gases” are returned to the process through the bypass or vent valve.

When sampling has been completed, close all valves and remove flask.

### 6.3 Sampling with a suction/delivery nozzle

Under this option, the vacuum is produced using a compressed air injection nozzle. The suction nozzle is connected to the side of the upper flange. This suction and delivery nozzle is operated by compressed air or inert gas and works according to the injector principle. The nozzle has no mobile parts and is maintenance-free. The product suction height depends on the operating pressure of the air supply and the product viscosity. The procedure is the same as for vacuum, refer to section 6.2. When sampling has been completed, close all valves.

### 6.4 Sampling with overpressure inside the reactor

Instead of a vacuum, the overpressure inside the reactor is used for sampling. Please note that hazardous gases may be released from the vacuum coupling (item 13). Therefore, you should ensure the safe discharge of the emerging gases.

The procedure is the same as for vacuum. When sampling has been completed, close all valves.

### 6.5 Cleaning the sampling system

Using various additional ports at the upper or middle flange, the liquid remaining in the suction tube can be pressed back to the reactor, or the system can be cleaned, using pressurized nitrogen.

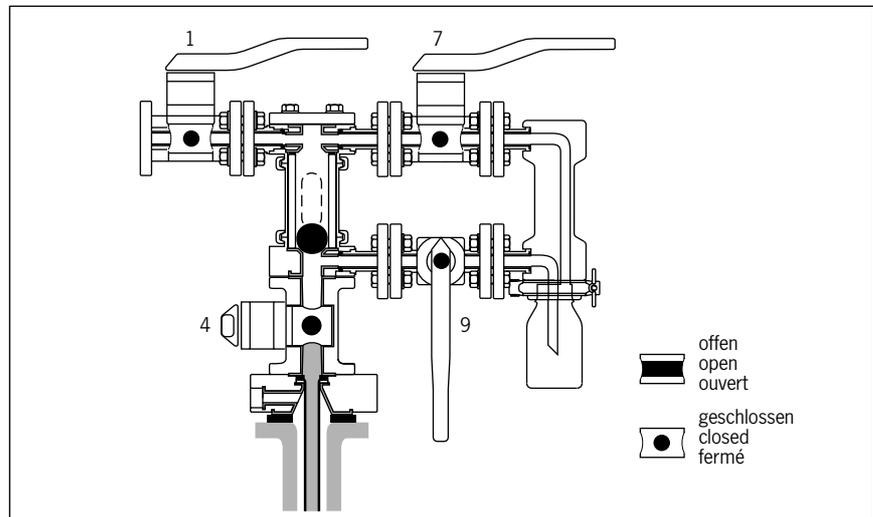


Figure 2 Initial condition

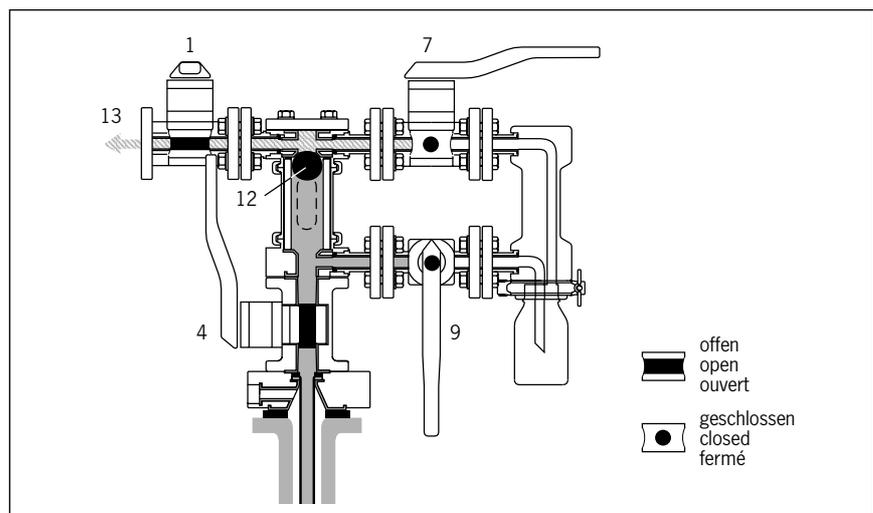


Figure 3 Valve position during sampling

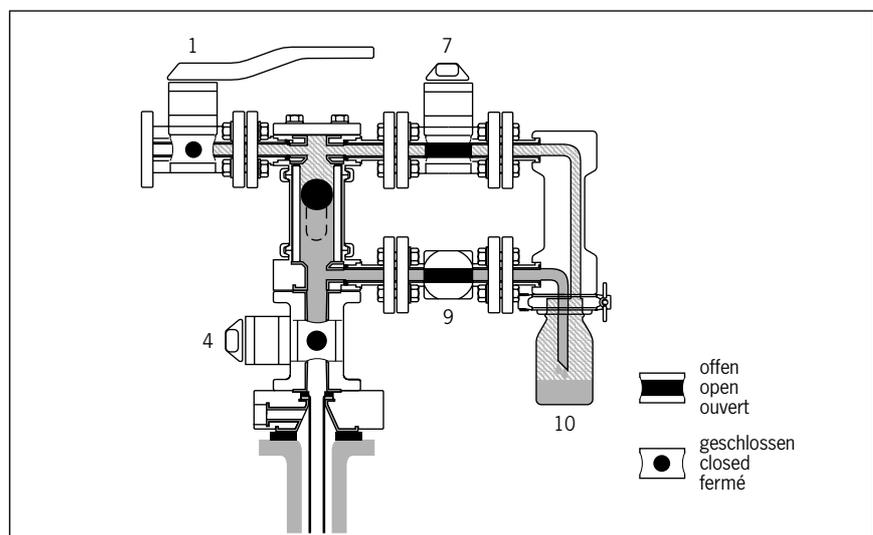


Figure 4 Filling the sampling flask

**7 Maintenance/Repair**

**7.1 Maintenance**

The Pfaudler fleXampler standard sampling system has been designed as a low-maintenance system. To ensure safe operation, you should regularly check the sampling system for its proper condition. In order to ensure trouble-free operation, you should carry out the following maintenance work.

After each sampling, check:

- Tube connections for tightness
- Valves for proper closing
- Main valve for safe locking

**7.2 Repair**

It may be necessary to repair the sampling system after its use in the process. In order to minimize the functional and safety risk, it is urgently recommended to send the sampling system to Pfaudler for repair and upgrading to the latest version or to call Pfaudler service personnel.

**⚠ Be sure to regularly check the correct seat of the guide sleeve, which is fastened at the dipped end between the sampling pipe and the inner tube of the Quatro Pipe or dip pipe. The maximum distance of the guide sleeve above the lower end of the Quatro Pipe or dip pipe must be less than 100 mm, if necessary, the distance has to be corrected by shifting the guide sleeve.**

For this purpose, unscrew the two threaded pins M12, set the position of the guide sleeve as shown in Figure 5 and secure this position by tightening the two threaded pins M12.

**Table 1: Maintenance intervals**

Component	Related documents	Inspection interval/year
Tightening torques of flange connections	OI 318/316	2x
Check gaskets, check for leaks	OI 318/316	2x
Visual inspection of the glass	DIN 28063	1x recommended
Check repaired glass spots for tightness		regularly
Function of safety devices		routinely
Check fleXampler sampling system for function	OI 383	after each sampling
Correct seat of the guide sleeve for the PTFE sampling pipe	OI 379	2x

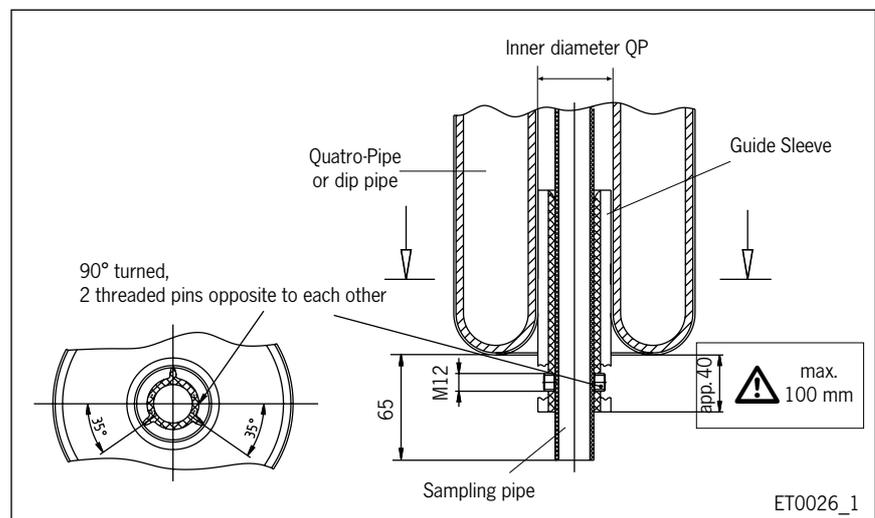


Figure 5 Detailed drawing of the bottom end of Quatro-Pipe.

## **8 Spare parts stock**

Spare parts must meet the technical requirements specified by the manufacturer. This will always be the case with original spare parts.

Pfudler recommends keeping a stock of the most important spare parts at the place of installation. The part numbers of spare parts are shown in the part list.

For spare parts orders, the following data has to be specified:

- Pfudler order number (5-digit number), i.e. as the case may be, either the order number of the reactor (refer to reactor nameplate), if the sampling system was supplied together with the reactor, or the order number of the sampling system, if supplied separately.
- Serial number of the sampling system (has been engraved on the nameplate attached to the lower flange)
- Details of the part needed (refer to Figure 1)

## **9 Faults; causes and correction**

In the event of extraordinary faults of the sampling system, such as leakages or premature failure, you should immediately stop the sampling process, clean the system and contact Pfudler.

## **10 Related documents**

- Assembly drawing of the sampling system and relevant part list
- ISO 2230 Storage of elastomers

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