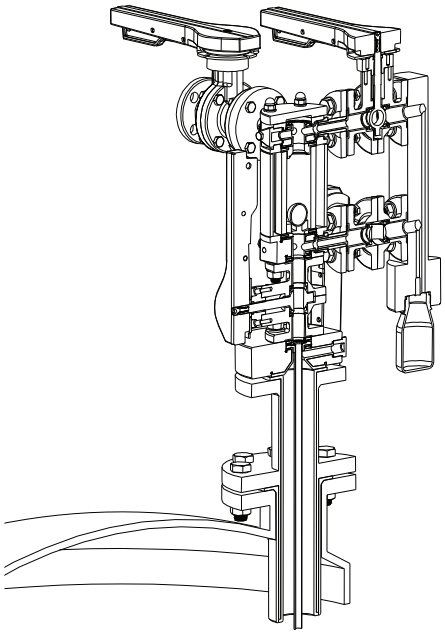
NEOTECHA PV REACTOR SAMPLING SYSTEM

INSTALLATION & MAINTENANCE INSTRUCTIONS

These installation and maintenance instructions must be read in full and completely understood before the installation!



GENERAL INFORMATION ON THE INSTALLATION AND MAINTENANCE INSTRUCTIONS

- These installation and maintenance instructions contain the information necessary for safe and correct installation and operation of the valve in the prescribed manner. If any difficulties are encountered during installation or operation which cannot be solved with the aid of the installation and maintenance instructions, please contact the supplier/manufacturer for more information.
- These installation and maintenance instructions comply with the relevant applicable EN safety standards.
- When installing the valve, the operator or the person responsible for the design of the installation must ensure that applicable national regulations are complied with.
- The manufacturer reserves all rights to make technical changes and improvements at any time.
- The use of these installation and maintenance instructions assumes that the user is qualified to "Qualified Personnel" level.
- Operating staff must be given appropriate training in the operating and maintenance instructions.

Validity of the installation and maintenance instructions

These installation and maintenance instructions are valid for all PV sampling valves for sampling into bottles, which have been manufactured since 28 November 2001 by the Neotecha AG company. The validity is only guaranteed until the next revision change!

SAFETY

Please also read through these notes carefully.

USAGE RESTRICTIONS

The product-wetted components must be classified as resistant to the product to be conveyed. Refer to appropriate literature or consult the manufacturer or distributor for advice.

MODIFICATION PROHIBITION

Mechanical modifications to the valves or the use of other manufacturers' parts for repair purposes are not permissible. Safety is not guaranteed if this requirement is disregarded. Repair work must only be carried out by the manufacturer's trained personnel.

WARNING ABOUT FORESEEABLE MISUSE

Valves and their accessories must not be misused as climbing aids.

Duty to comply with the instructions for operation, maintenance and servicing

These operating instructions are part of the delivery package and must be kept clean and made accessible to the user.

ELECTRICAL

If static charges can lead to explosions, the valve must be earthed by means of the earthing accessory.
Alternative: Use valves with electrically conductive linings. Please contact your supplier!

THERMAL

Due to the range of operating temperatures between -20°C and +200°C, surface temperatures from -20 °C to +200°C can be present on the valve bodies. Suitable precautions should be taken at the installation stage to protect against burns due to high or freezing temperatures. Insulated gloves should be worn when using the valve. In case of fire, the mechanical strength of the PFA coatings is no longer guaranteed above 250°C.

MECHANICAL

When using the hand lever, it should be ensured that there is still sufficient clearance for the hands at the end position of the handle, so that there is no risk of trapping. Excessive oscillation and vibration should be avoided, to prevent the bolts loosening.

REQUIREMENTS FOR THE OPERATOR

This means people who are familiar with the erection, installation, commissioning, operation and maintenance of the product and have appropriate qualifications relating to their activities and functions, such as, for example:
- instruction in and duty to comply with all installation-related, regional and internal works regulations and requirements.
- training or instruction in accordance with the Safety Standards for personal care and use of appropriate safety equipment and protective workgear, like, for example, personal protection equipment (insulated gloves or similar), suitable for the operating conditions.

Furthermore, these people must have read and understood these instructions.

TRANSPORT & STORAGE

Transport
- transport temperature -20°C to +65°C
- protect against external force (impact, shock, vibration)
- do not damage the coating

Storage
- storage temperature -20°C to +65°C, dry and dust-free.
- a drying agent or heating is required in damp storage areas to protect against condensation.

Handling prior to installation
- do not remove the protective caps until immediately prior to installation
- protect against the effects of weather, such as dampness, (or else use a drying agent)
- proper treatment prevents damage

CAUSE AND REMEDY OF OPERATING FAULTS

If the PV Reactor function or operating action is faulty, a check should be made to ensure that the assembly and installation work has been carried out and completed in accordance with the installation and maintenance instructions. The information relating to material, pressure, temperature and direction of flow should be compared with the installation diagram of the reactor system. Furthermore, a check should be made on whether the installation conditions correspond to the technical data given in the data sheet or on the rating plate.

The safety regulations must always be observed when troubleshooting.

Decommissioning
Removal of the valve for repair or servicing is often carried out carelessly, as the PV reactor has to be repaired or replaced in any case. However, it is recommended that the valve be removed with care, without damaging the PFA coating, so that the possible cause of damage can be determined after removal.

ATTENTION!
Check that the PV reactor and reactor is depressurized and drained.
With corrosive, inflammable, aggressive or toxic media, flush out and ventilate the PV reactor system.

1. Only allow assembly work to be carried out by qualified personnel (see Section 2.5)
2. Loosen all flange bolts and withdraw them until the PV reactor can be removed.

DISPOSAL

Hand in the correctly cleaned valve to the scrap material recycling plant.

Badly cleaned PV reactors can cause severe burning of the hands and other parts of the body.

If the sampler is passed on to a third party, the manufacturer does not guarantee the safety of the equipment.

COMMISSIONING

General commissioning
Tools for increasing the lever or handwheel torque are not allowed.
Any debris left in the pipeline and valves (dirt, welding beads, etc.) will inevitably lead to leakage.

Before each commissioning of a new system or re-commissioning of a system after repair or modification, it must be ensured that:
- *all installation and assembly work has been completed in accordance with the regulations!*
- *commissioning is only undertaken by "Qualified Personnel"*
- *the valve is in the correct operating position.*
- *new protective equipment is installed or existing protective equipment repaired.*
- *valve and valve flanges are tight*
- *valve functionality and smooth operation*

Mounting additional modules
Where valves are fitted with additional options (limit switches, etc.) these should be connected according to their operating mode in line with the installation diagram.

NOTES ON DANGERS DURING INSTALLATION, OPERATION AND MAINTENANCE

Safe operation of the valve is only guaranteed if it has been correctly installed, commissioned and maintained by qualified personnel (see "Qualified Personnel"), taking into account the warning information of these installation and maintenance instructions. In addition, compliance with the general installation and safety regulations for the pipeline or plant construction, together with the correct use of tools and protective equipment, must be ensured.

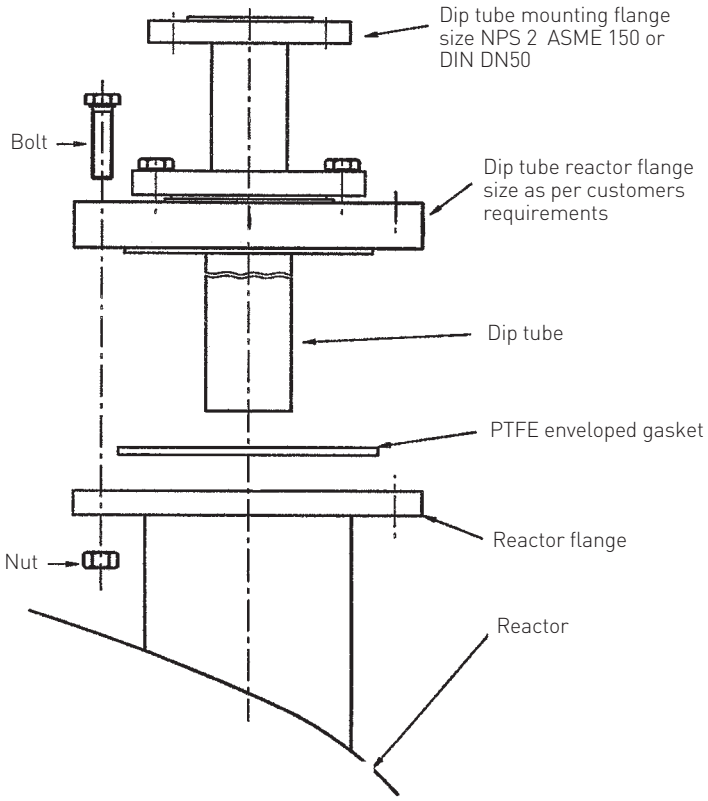
The installation and maintenance instructions must be strictly followed when any work is carried out on the valve or when handling the valve. Non-observance can result in injuries or damage to property.

INSTALLATION

Dip tube

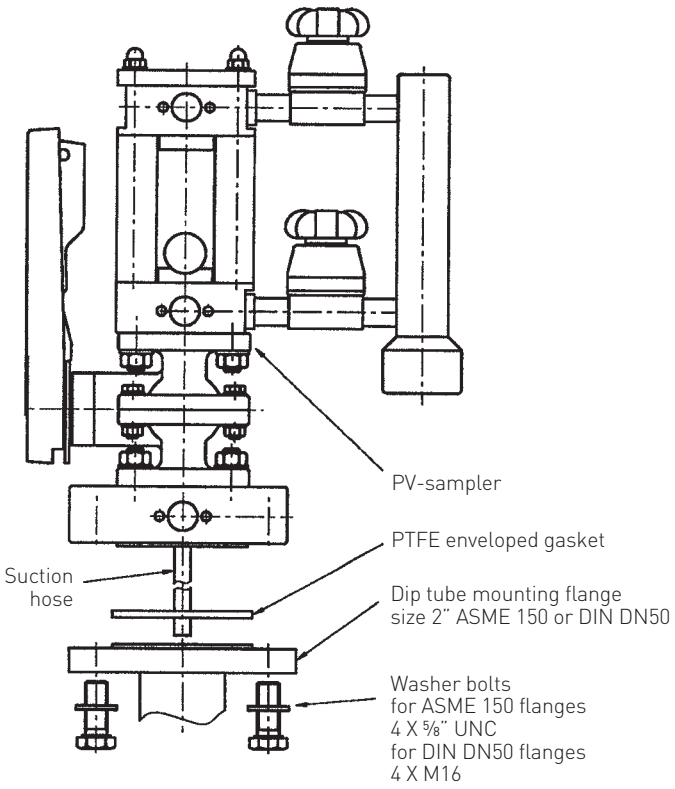
- Determine reactor flange where sampling system is to be installed
- Insure that reactor flange is the same size as the dip tube reactor flange
- Place PTFE enveloped gasket (supplied by end user) over reactor flange
- Insert dip tube through gasket and reactor flange
- Make sure dip tube is lowered vertically into reactor
- Lower dip tube gently till both flanges meet
- Take bolts, nuts and washers (supplied by end user) and secure dip tube with reactor flange
- Tighten bolts to get a non leaking connection

Maximum pressure and temperature range, see tagplate.



PV Sampler

- Take PV sampler and uncoil the suction hose In case the suction hose has been kinked use a hot air gun and heat the suction hose to about 180°C. The hose will assume the original shape again. Use a wet cloth and cool it down before moving it. Suction hose should be approx. 50 mm longer than dip tube.
- Place PTFE enveloped gasket (supplied by end user) over dip tube mounting flange
- Insert suction hose through gasket and into dip tube
- Secure sampler:
  - ASME version with 4 x ⅝" UNC bolts
  - DIN version with 4 x M16 bolts (supplied by end user)
- Tighten bolts to get a non leaking connection

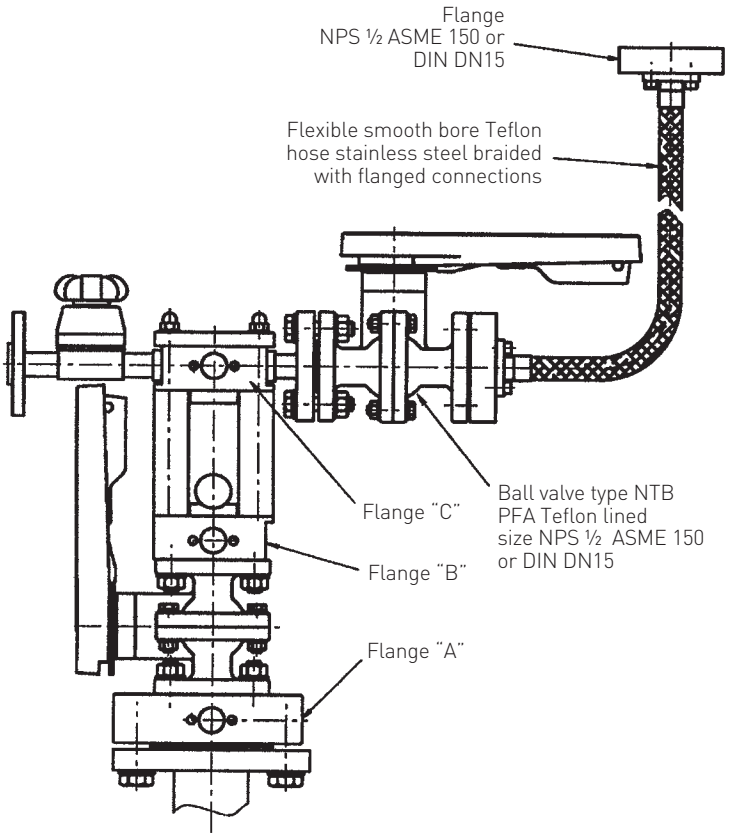


Auxiliary connections
Most auxiliary connections required on the PV sampler are vacuum, nitrogen and solvent.

All connections to the sampler should be made with smooth bore flexible Teflon hoses stainless steel braided.

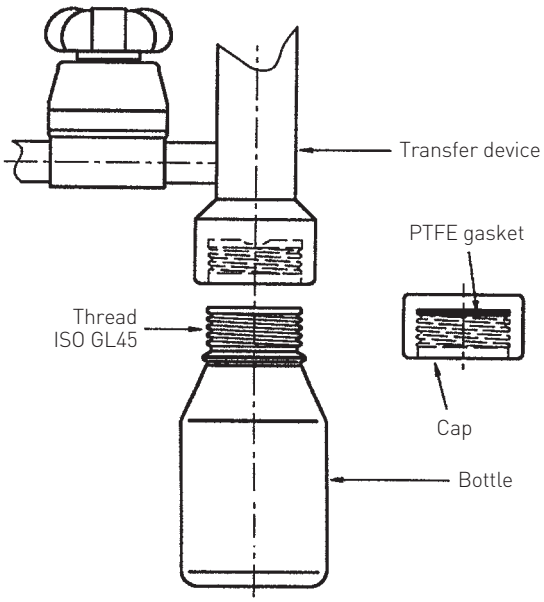
Flanges A, B and C are equipped with connecting ports:
- Flange A has 2 ports
- Flange B has 3 ports and a mounting face for the pump bracket
- Flange C has 4 ports and an additional one can be supplied in the cover (total of 5)

The connecting port is a factory standard 2 hole mini flange version Teflon PFA lined.

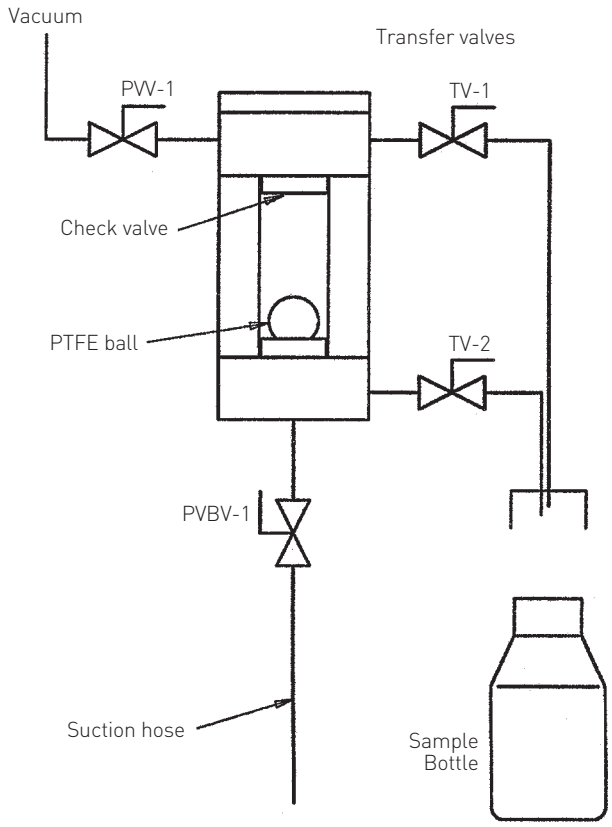


Bottle
- Depending on the size of sample volume, the PV sampler is supplied with an appropriate size bottle i.e.
- Sample volume
  150 ml: bottle size 250 ml
  250 ml: bottle size 250 ml
  500 ml: bottle size 500 ml
  1000 ml: bottle size 1000 ml
- Unscrew cap on supplied Borosilicate bottle and screw it into transfer device

ATTENTION
- *After PV sampler has been installed, check all bolts, buts and screws for tightness*
- *Set sampler under pressure max. 10 bar and check for possible leaks*
- *Close all valves on sampler*
- *Screw supplied sample bottle into transfer device on PV sampler*
- *After PV sampler has been installed, close all valves on the sampler*



SCHEMATIC DIAGRAM



OPERATION

Operating instructions for sampler with transfer device and vacuum lift

Taking a sample

- Before taking a sample, make all connections are properly connected
- Make sure all valves on PV sampler are closed
- Make sure sample bottle is connected to transfer unit
- Insure that the vacuum supply is functioning

1. Open ball valve PVBV-1 on sampler carefully till fully open
2. Open vacuum valve PVV-1 carefully
   Liquid will now be drawn through suction hose into sight glass. Make sure liquid level rises slowly in sight glass. Hollow PTFE ball will float on liquid and cut off vacuum when pressed into the check valve seat
3. Close ball valve PVBV-1 immediately
4. Close vacuum valve PVV-1

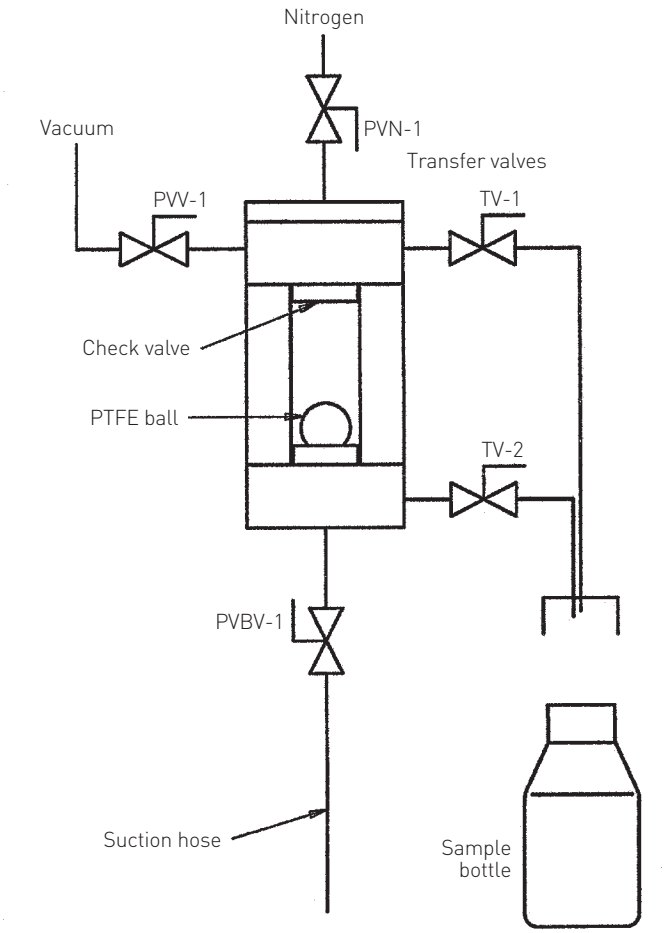
A sample has now been drawn from the reactor

Transfer of sample into bottle

1. Open transfer valve TV-1 on transfer device
2. Open transfer valve TV-2 on transfer device
   Liquid in sight glass will now transfer into bottle
3. When all liquid has been transferred into bottle, close both valves TV-1 and TV-2
4. Unscrew the bottle from the transfer device
5. Take cap and close bottle

Displaced air in bottle has been transferred back into sight glass and has not contaminated the atmosphere.

SCHEMATIC DIAGRAM



Operating instructions for sampler with transfer device, vacuum lift and nitrogen connection

Taking a sample

- Before taking a sample, make sure all connections are properly connected
- Make sure all valves on PV sampler are closed
- Make sure sample bottle is connected to transfer unit
- Insure that the vacuum supply is functioning
- Insure that the nitrogen supply is functioning, recommended pressure 2-3 bar

1. Open ball valve PVBV-1 on sampler carefully till fully open
2. Open vacuum valve PVV-1 carefully
   Liquid will now be drawn through suction hose into sight glass. Make sure liquid level rises slowly in sight glass. Hollow PTFE ball will float on liquid and cut off vacuum when pressed into the check valve seat.
3. Close ball valve PVBV-1 immediately
4. Close vacuum valve PVV-1

A sampler has now been drawn from the reactor

Transfer of sample into bottle

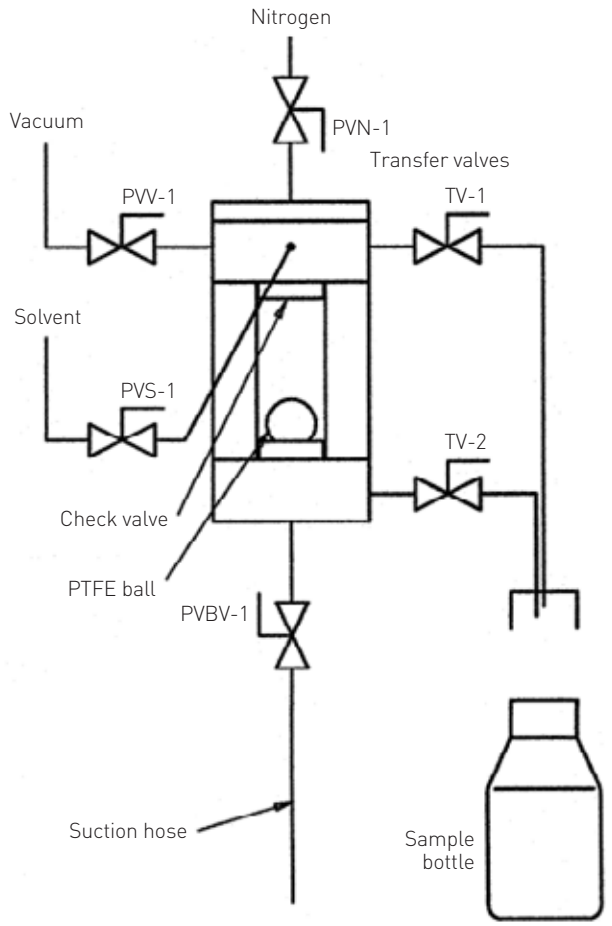
1. Open transfer valve TV-1 on transfer device
2. Open transfer valve TV-2 on transfer device
   Liquid in sight glass will now transfer into bottle
3. When all liquid has been transferred into bottle, close both valves TV-1 and TV-2
4. Unscrew the bottle from the transfer device
5. Take cap and close bottle

Displaced air in bottle has been transferred back into sight glass and has not contaminated the atmosphere.

Blow down of suction hose

1. Open ball valve PVBV-1 on sampler
2. Open nitrogen valve PVN-1 on sampler for about 3 seconds
   Liquid in sampler and suction hose is now blown out
3. Close ball valve PVBV-1 on sampler
4. Close nitrogen valve PVN-1 on sampler
5. Open transfer valve PV-1 and close it again
   Pressure in sight glass has now been relieved

SCHEMATIC DIAGRAM



Operating instructions for sampler with transfer device, vacuum lift, nitrogen and solvent connection

Taking a sample

- Before taking a sample, make sure all connections are properly connected
- Make sure all valves on PV sampler are closed
- Make sure sample bottle is connected to transfer unit
- Insure that the vacuum supply is functioning
- Insure that the nitrogen supply is functioning, recommended pressure 2-3 bar

1. Open ball valve PVBV-1 on sampler carefully till fully open
2. Open vacuum valve PVV-1 carefully
   Liquid will now be drawn through suction hose into sight glass. Make sure liquid level rises slowly in sight glass. Hollow PTFE ball will float on liquid and cut off vacuum when pressed into the check valve seat
3. Close ball valve PVBV-1 immediately
4. Close vacuum valve PVV-1

A sample has now been drawn from the reactor

Transfer of sample into bottle

1. Open transfer valve TV-1 on transfer device
2. Open transfer valve TV-2 on transfer device
   Liquid in sight glass will now transfer into bottle
3. When all liquid has been transferred into bottle, close both valves TV-1 and TV-2
4. Unscrew the bottle from the transfer device
5. Take cap and close bottle

Displaced air in bottle has been transferred back into sight glass and has not contaminated the atmosphere.

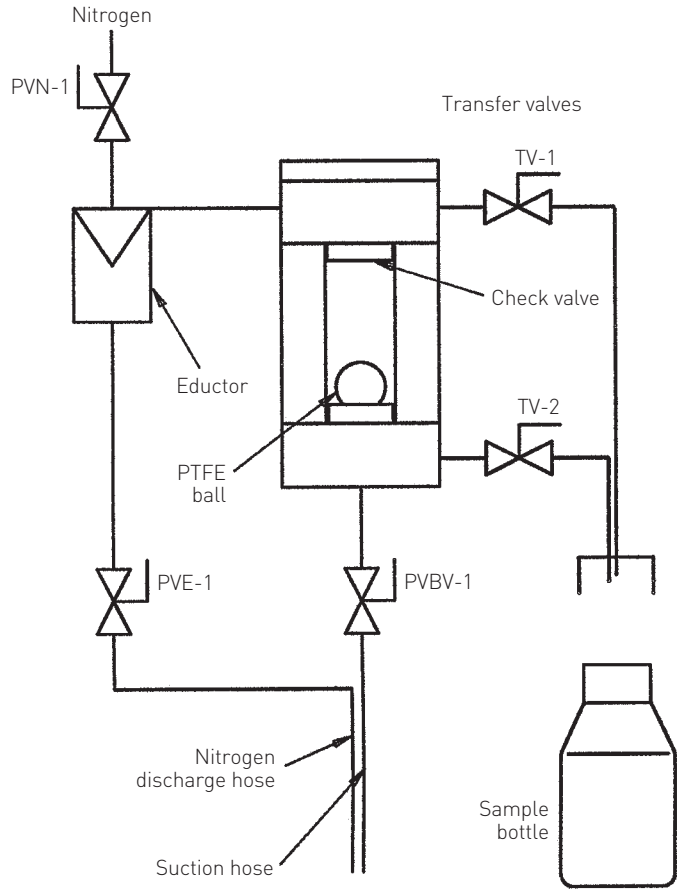
Blow down of suction hose

1. Open ball valve PVBV-1 on sampler
2. Open nitrogen valve PVN-1 on sampler for about 3 seconds
   Liquid in sampler and suction hose is now blown out
3. Close ball valve PVBV-1 on sampler
4. Close nitrogen valve PVN-1 on sampler
5. Open transfer valve TV-1 and close it again
   Pressure in sight glass has not been relieved

Rinsing

1. Connect an empty 250 ml bottle to the transfer device
2. Fill sight glass with solvent by opening valve PVS-1. Close PVS-1
3. Open nitrogen valve PVN-1
4. Open transfer valve TV-2 and transfer 50 ml solvent to bottle. Close valve again
5. Open ball valve PVBV-1 till all solvent is pressed out of sight glass into reactor. Close valve again
6. Close nitrogen valve PVN-1
7. Open transfer valve TV-1 and close it again
8. Unscrew bottle and close it with cap
9. Dispose of solvent in an appropriate way

SCHEMATIC DIAGRAM



Operating instructions for sampler with transfer device and vacuum lift with eductor

Taking a sample

- Before taking a sample, make sure all connections are properly connected
- Make sure all valves on PV sampler are closed
- Make sure sample bottle is connected to transfer unit
- Insure that the nitrogen supply is functioning, recommended pressure 2-3 bar

1. Open ball valve PVBV-1 on sampler carefully till fully open
2. Open nitrogen discharge valve PVE-1 fully
3. Open nitrogen discharge valve PVN-1 carefully
   Liquid will now be drawn through suction hose into sight glass. Make sure liquid level rises slowly. Hollow PTFE ball will float on liquid and cut off vacuum when pressed into the check valve seat
4. Close ball valve PVBV-1 immediately
5. Close nitrogen discharge valve PVE-1
6. Close nitrogen supply valve PVN-1

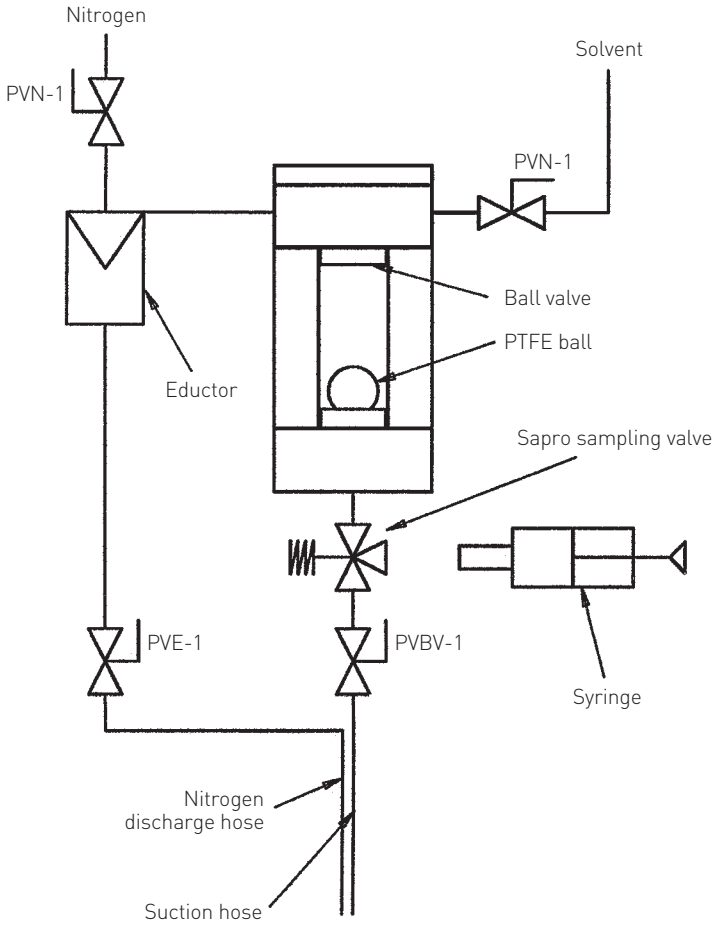
A sample has now been drawn from the reactor.

Transfer of sample into bottle

1. Open transfer valve TV-1 on transfer device
2. Open transfer valve TV-2 on transfer device
   Liquid in sight glass will now transfer into bottle
3. When all liquid has been transferred into bottle, close both valves TV-1 and TV-2
4. Unscrew the bottle from the transfer device
5. Take cap and close bottle

Displaced air in bottle has been transferred back into sight glass and has not contaminated the atmosphere.

SCHEMATIC DIAGRAM



Operating instructions for sampler with Sapro® sampling valve and eductor

Taking a sample

- Before taking a sample, make sure all connections are properly connected
- Make sure all valves on PV sampler are closed
- Insure that the solvent supply is functioning
- Insure that the nitrogen supply is functioning, recommended pressure 2-3 bar

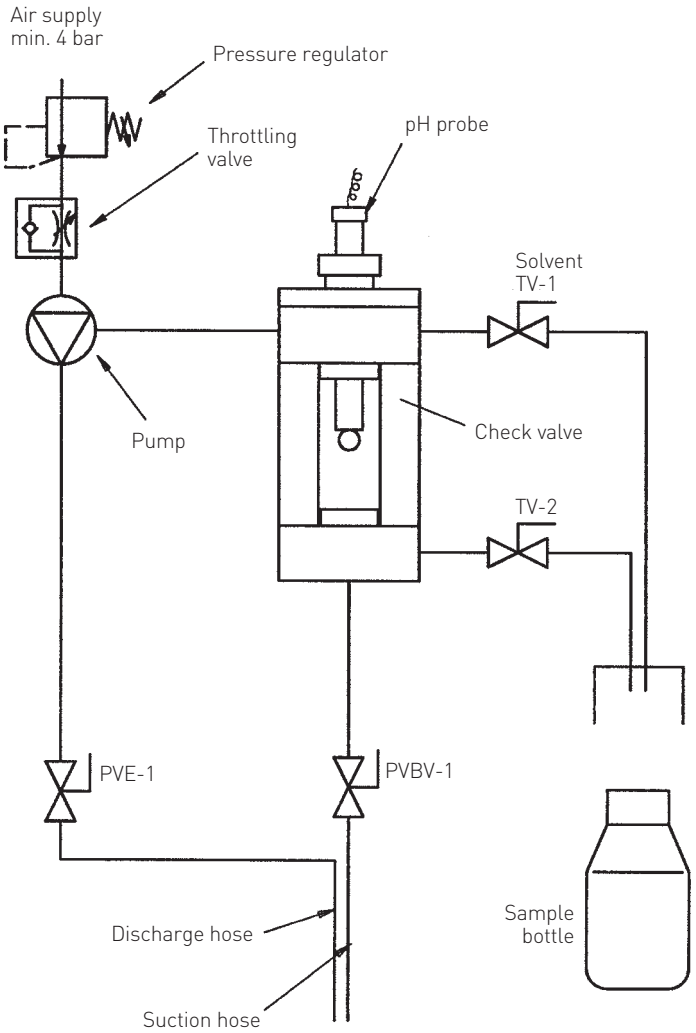
1. Open ball valve PVBV-1 on sampler carefully till fully open
2. Open nitrogen discharge valve PVE-1 fully
3. Open nitrogen supply valve PVN-1 carefully
   Liquid will now be drawn through suction hose into sight glass. Make sure liquid level rises slowly. Hollow PTFE ball will float on liquid and cut off vacuum when pressed into the check valve seat
4. Close ball valve PVBV-1 immediately
5. Close nitrogen discharge valve PVE-1
6. Close nitrogen supply valve PVN-1

A sample has now been drawn from the reactor

Transfer of sample into syringe

1. Take syringe and connect to Sapro® sampling valve
2. Open syringe by pressing down the handle and lock it in the open position
   For more information on the Sapro® valve and syringe, consult the Sapro® operating manual
3. Open nitrogen supply valve PVN-1
   The sample is now pressed out of the sight glass into the syringe. Depending on the size of the syringe, sample will remain in the sight glass. Close PVN-1
4. Release handle on syringe and disconnect syringe from the Sapro® valve
5. Open ball valve PVBV-1 on sampler carefully till fully open
6. Open nitrogen supply valve PVN-1 for 2-3 seconds and close it again
   Remaining sample in sight glass has now been pushed back into reactor through suction hose

SCHEMATIC DIAGRAM



Operating instructions for sampler with transfer device and diaphragm circulating pump

Taking a sample

1. Make sure transfer valves TV-1 and TV-2 are closed
2. Insure that the pH-probe is properly connected
3. Make sure sample bottle is connected to transfer unit
4. Start circulating pump. Open ball valve PVBV-1 and discharge valve PVE-1
5. Close ball valve PVBV-1 on sampler
6. Close discharge valve PVE-1
7. Interrupt air supply to circulating pump

Transfer of sample into bottle

1. Open transfer valve TV-1 and TV-2
   Sample will now transfer to bottle
2. Close transfer valve TV-1 and TV-2
3. Unscrew bottle from transfer device
4. Take cap and close bottle

A sample has now been drawn from the reactor

Displaced air in bottle has been transferred back into sight glass and has not contaminated the atmosphere.