



CRP

**INSTALLATION, OPERATING AND MAINTENANCE
INFORMATION
FOR INLINE SAMPLING VALVES**

Sampling Valves

Installation Commissioning and Operating Instructions – SD IL 300 & SD IL 400 Inline Sampling Valve

This procedure provides detailed information on the field installation, commissioning and operation of the type SD IL 300 & 400 wafer style in-line sampling valve with spring loaded pull out handle.

Overview

The valve is available to mount in either horizontal or vertical flanged pipework. Ensure that the valve is mounted in the correct orientation so that the bottle hangs vertically down below the valve. The valve is able to sample both hot and hazardous media, so it is very important that suitable protective clothing and eye protection is worn when commissioning and operating the valve. There are several possible outlet arrangements for these valves, the most common being a threaded bottle connector.

Storage

The sampling valve should be ideally stored in cool dry conditions in a dust free environment. In particular the flange faces should be protected from damage. It is recommended that the valve should be left in its original packaging until ready for assembling in to the pipeline.

Installation

The valve is of a wafer style designed to be mounted in line between flanges. Choose a position within the pipeline that is easily accessible to ensure trouble-free function of the valve by the operator. The mating flange faces must be free from debris and foreign matter prior to installation. Any remaining gasket material should be removed from the flange faces. The valve should also be located such that the sample collector can easily be put in position and removed from position after a sample has been taken.

Gaskets

For unlined valves, gaskets must be used when bolting up the valve within the pipeline. CRP recommend Goretex GR expanded PTFE type gaskets or PTFE envelope gaskets.

For PFA lined valves installed in PTFE/PFA lined piping, no gaskets are required. However if the valve is to be installed in other types of pipework gaskets should be used. CRP recommends PTFE envelope gaskets.

Bolting Materials & Tightening Torques

Bolting should be of good quality, clean and well lubricated. The use of washers is recommended to ensure correct even torque. Bolts should be tightened by use of a torque wrench in strict sequence of diagonally opposite pairs.

For unlined valves the gasket manufacturers recommended torques should be used.

For PFA lined valves, it is recommended that all bolts are checked at least 24 hours after commissioning or following the initial full process cycle. The following table gives recommended torque levels for flange to flange connections. Nb. The torque figures given are the minimum to effect a seal, they may be exceeded by a value of 50% to effect a seal.

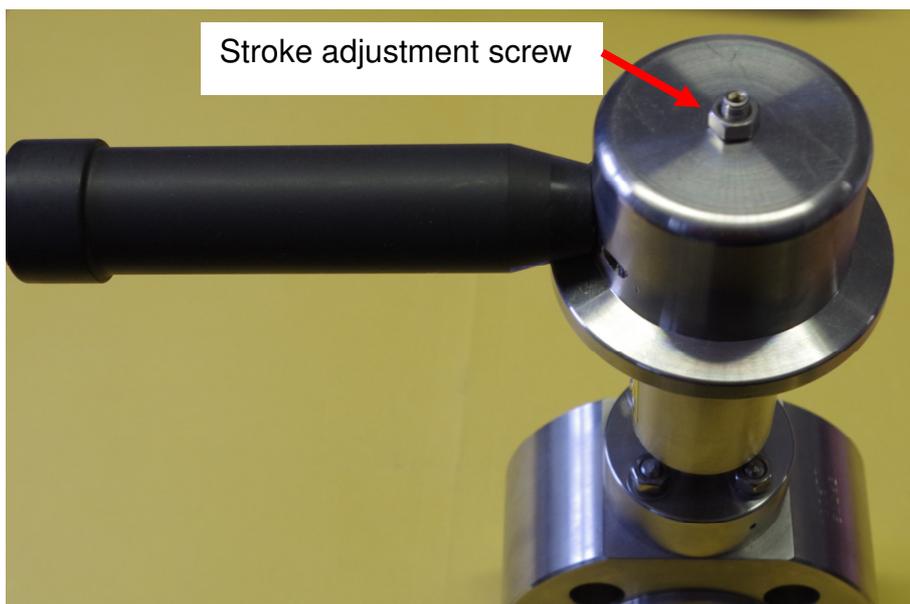
Valve Size	Recommended Torque	
NB	ft.lbs	N.m
3/4" NB (DN20)	10	14
1" NB (DN25)	14	19
1 1/2" NB (DN40)	20	27
2" NB (DN50)	35	47
2 1/2" NB (DN65)	45	61
3" NB (DN80)	54	73
4" NB (DN100)	40	54
6" NB (DN150)	80	108

Venting

The sampling valve is supplied with a vent connection which should be connected into the site vent system, or as a minimum, vented away from the operator so that in the case of any fumes or liquid escaping they do not come in contact with the operator.

Commissioning

The valve needs to be properly set up before use in production. The flow rate of the sample liquor must be adjusted so that the bottle fills at a steady controlled rate. The sample flow rate can be affected by the pressure within the process pipeline and by the stroke of the sampling valve spindle. It is this stroke that must be adjusted to achieve a suitable sample flow rate. The stroke adjustment screw is located centrally at the top of the handle assembly.

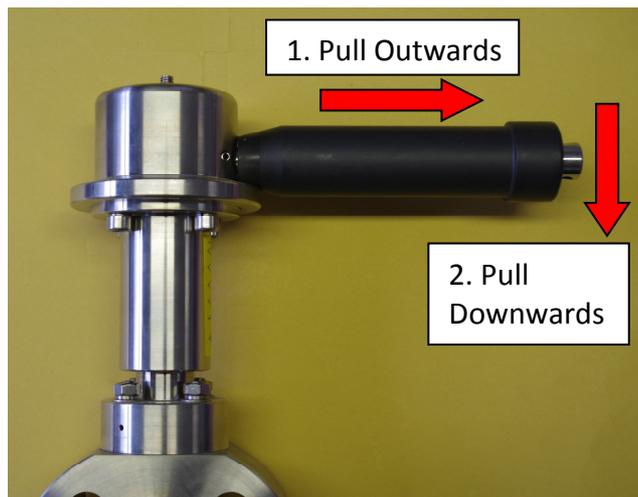


Before carrying out any adjustments ensure that a sample bottle is installed. To adjust the set screw release the locking nut with a spanner and back off to allow adjustment of the set screw. The valve will be supplied with the set screw wound down to its lowest level preventing the valve from being operated. If this is not the case then screw down the set screw till finger tight. To set the correct flow through the sample valve it is necessary to operate the handle by firstly pulling the handle outwards away from the valve body then applying downwards force, whilst progressively turning the set screw anticlockwise until the desired flow rate is achieved. Once satisfied with the valve operation tighten the lock nut to maintain the set screw position. Replace the sample bottle with a clean one. If required fit a padlock to the valve handle through the hole at the end of the shaft.

Operation

Before attempting to operate the valve make certain that the operator wears adequate personal protection.

To take a representative sample from the pipeline, firstly ensure a clean sample bottle is fitted to the valve, and remove padlock if fitted from valve handle. Pull the handle outwards away from the valve body then firmly downwards and observe the sample being taken in the sample bottle. When the bottle has been filled to the correct level release the handle and fit the padlock back in place if fitted. Remove the sample bottle and fit the bottle lid. Fit a new clean sample bottle to the sampling valve. Nb. If the valve is supplied with a dust cap, fit the dust cap between taking samples, rather than a spare bottle.



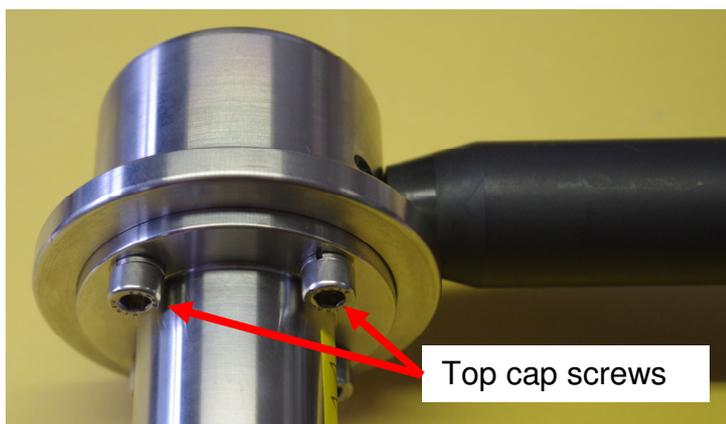
Nb. The operator may notice when the valve handle is pulled outwards, that there is some vertical play in it, both up and down. This is intentional to ensure that the spring in dead mans handle fully closes the valve when the handle is released.

Planned Preventative Maintenance

The sampling valve is designed to give long service life but you may well consider the implementation of a planned preventative maintenance schedule. The interval between these inspections can vary widely due to many factors such as operating frequency, process temperatures and the chemicals being sampled. CRP recommend that initially an annual inspection is made of the valve, which can be subject to change as experience is gained in the samplers performance on the particular process.

Recommended Inspection.

In line sampling valves have two sealing areas, the tip seal preventing liquor escaping into the sample bottle and the spindle seal, preventing liquor escaping around the handle assembly. Both of these areas should be inspected to check for leaks.



The top cap screws (see photo above) should be checked to ensure that they are tight. An early indication that they may have come loose is that the valve handle and top cap can be rotated slightly. The maximum recommended torque for these screws is 10 Nm.

Additional Instructions for Specific Valve Outlet Arrangements

Nozzle

No additional installation, commissioning or maintenance instructions.

Operation.

- With no cabinet. When taking a sample, simply hold the sample container with the outlet nozzle slightly inside the neck of the bottle, but ensuring that there is sufficient space between the nozzle and the bottle neck to allow gas to escape from the bottle as it is filled. Operate the valve as described above.
- With a cabinet. When taking a sample, place the sample container on the base of the cabinet, with the opening of the container directly below the nozzle (or with the nozzle protruding into the container if this is how it is designed). Operate the valve as described above.
- General. Since the nozzle is not covered between taking samples, particular care should be taken to clean the nozzle before taking samples to ensure that the sample is not contaminated by anything that may have adhered to the nozzle since last a sample was taken.

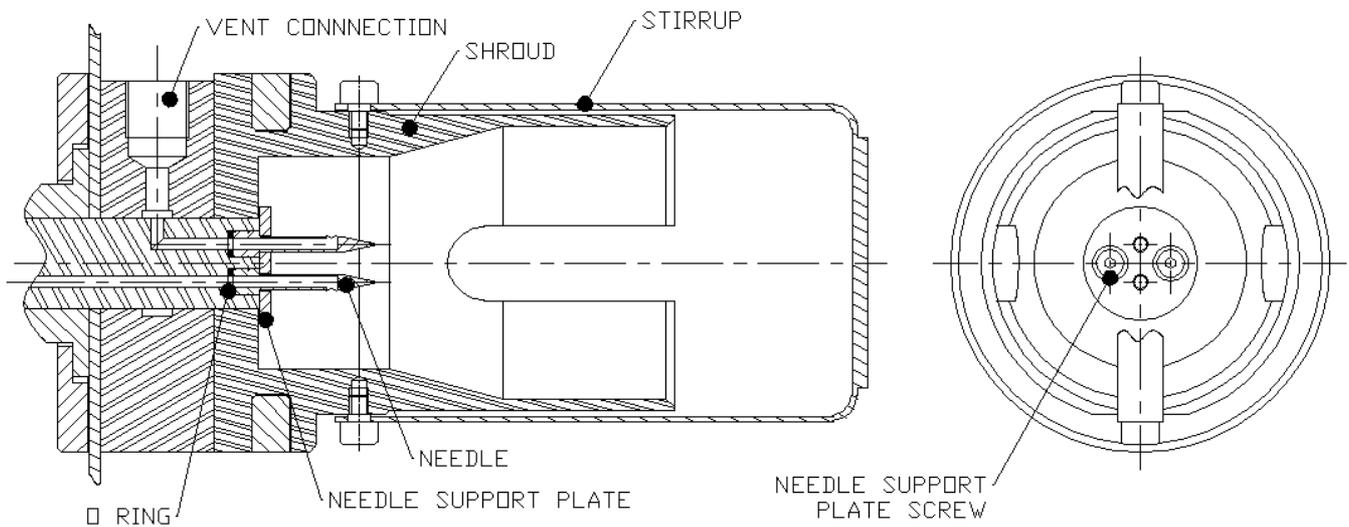
Threaded Bottle Connector

No additional installation, commissioning, operation or maintenance instructions

Septum Assembly

No additional installation or commissioning instructions.

The drawing below shows a typical septum assembly.



Operation.

To fit a bottle to a septum assembly, simply push back the stirrup, push the bottle up into the bottle shroud. As the septum needle(s) pierce the septum cap, there will be a degree of resistance to pushing the bottle upwards. Once the bottle is pushed up as far as it will go, swing the stirrup under the bottle to support it during the sampling process. Once the sample has been taken, simply swing back the stirrup and pull the bottle downwards out of the bottle shroud. A new clean bottle should be fitted to the septum assembly after taking a sample to protect the septum assembly from contamination from the environment and to minimize the chance of personnel injury from the needles.

Nb. The septum needles themselves are sharp. It is therefore important not to put fingers up inside the septum shroud since piercing injuries are possible.

Maintenance.

The only additional maintenance issue that needs to be considered with septum assemblies is having to replace the septum needles if they become blunt. The frequency with which this needs to be done is very variable and depends upon factors such as, the frequency of sampling, the media being sampled, the material of the septum cap, etc. Therefore, it is up to the individual customer to collect sufficient data to determine when the needles should be replaced.

To remove septum needles, if possible remove the valve from the line and turn it so that the needles are pointing vertically upwards. Unscrew the two needle support plate screws. Remove the screws and the support plate. The needles can now be pulled out of their housing, and the O rings that sit under the needles should be removed.

To fit new needles, fit new O rings into the bottom of the holes which house the needles. Push new needles in on top of the O rings, taking care to ensure that the outlet holes of the needles point directly away from each other. Fit the needle support plate over the needles and screw in the needle support plate screws to hold the support plate in place. Nb. Since the screws are screwed directly into PTFE, it is easy to cross thread them, and/or to over tighten them. Great care must be taken to avoid both of these actions since either will result in needing a new septum dip tube. The valve can now be returned to service.

Vent Connection, not to atmosphere

No additional operation or maintenance instructions.

As standard, bottle connector vent connections vent to atmosphere. However, if the liquor to be sampled produces fume are particularly hazardous, one option is to supply the vent connection with a connector to allow it to be connected directly to the plant exhaust system.

Installation

When fitting the sample valve in place, ensure that the vent connection is connected to the appropriate plant exhaust system to ensure that fumes are removed in the appropriate manner.

Commissioning

During commissioning of the sample valve, check that the vent exhaust has been connected correctly and functions as intended.

Purge/Flush Connection

No additional maintenance instructions.

As standard, sample valve outlet arrangements do not come with a purge/flush connection. However, on occasion such a connection is required. Nb. A purge refers to blowing the outlet arrangement through with a gas, such as nitrogen. A flush refers to pumping a wash liquor through the outlet arrangement.

Installation

When fitting the sample valve in place, ensure that the purge/flush connection is connected to the appropriate source of gas and/or liquid to carry out the purging and/or flushing. A suitable on/off valve should be fitted as close to the sample valve as possible on the purge/flush line. If the purge gas is at an elevated pressure, it may be necessary to fit a regulator to reduce this to a suitable level, typically less than 8 psi.

Commissioning

During commissioning of the sample valve, check that the purge/flush line and on/off valve has been connected correctly and functions as intended.

Operation – Purge Only

Once a sample has been taken, and typically before removing the sample bottle from the bottle connector/septum assembly, fairly briefly open the purge on/off valve, then close it again. This serves to blow the purge gas through the sample outlet arrangement and to blow any remaining drops of sample liquor out of the outlet arrangement and into the sample bottle. The sample bottle can then be removed, and a new one fitted in its place. Nb. If preferred, a new sample bottle can be fitted prior to purging the outlet arrangement.

Operation – Purge and Flush

Once a sample has been taken, remove the sample bottle from the bottle connector/septum and fit a lid to it if required. Fit a new sample bottle to the bottle connector/septum assembly. Open the flush valve and flush the sample valve outlet arrangement through with wash liquor, until all traces of process liquor have been washed away. Close the flush valve. Briefly open the purge valve to blow the sample valve outlet arrangement clear of wash liquor. Remove the sample bottle that contains the wash liquor and dispose of appropriately.

Safety Cabinet

No additional operation or maintenance instructions.

Installation

In most cases safety cabinets are supported by the sample valve, and do not require any additional supports.

Typically, safety cabinets are supplied with a vent connection and a drain connection. The vent connection is to allow the safety cabinet to be connected to the plant exhaust system to suck fumes out of the cabinet. The drain connection is to allow the bunded base of the cabinet to be connected to a suitable drain so that any liquor that spills into the base of the cabinet can flow to drain rather than collect in the base of the cabinet. If required, the drain and vent connections should be connected up as part of the installation process.

Commissioning

If either the drain or vent connection have been connected up, during commissioning, their function should be checked to ensure that they are working satisfactorily.

Application and Process / Media Conditions

It is the responsibility of the customer to ensure that the sampling device is suitable for conveying the intended chemical(s) and for the intended operating conditions. Careful consideration must be given to the effects of the process media on the valve, whether from corrosion, erosion temperatures etc.

Important Notes

- (a) Whilst the valve is of a strong robust design, consideration must be given to the effects of corrosion, erosion/wear, including potential effects from turbulence and vortices etc. For lined valves, it should be noted that while PFA has outstanding corrosion resistance, it has limited erosion resistance, and contained fluid velocities should be kept below 15m/s. For all valves, the valve seats need to be checked regularly for signs of wear. In addition, these products are not approved for conveying unstable fluids.
- (b,c) Maximum and Minimum Allowable Operating Pressures (bar(g)) and Temperatures.
In line sampling valves can be split into 3 basic groups as detailed below:

1. Unlined Wafer Pattern: 1" – 6" inclusive, to fit between ASME B16.5 Class 150, BS EN 1092-1 PN10/16, BS10 Table D & E flanges.
2. Unlined Wafer Pattern: 1" – 2" inclusive, to fit between ASME B16.5 Class 300 flanges.
3. PFA lined stainless steel wafer pattern: 1" – 6" inclusive, to fit between ASME B16.5 Class 150, BS EN 1092-1 PN10/16, BS10 Table D & E flanges.

Their allowable operating temperature and pressure ranges are shown in the table below.

Valve Type	Temperature		Maximum Pressure (barg)
	Minimum	Maximum	
1	-29°C	200°C	16
2	-29°C	200°C	30
3	-29°C	180°C	10

All valves are suitable for operation at full vacuum, although the sample outlet system needs to be designed to suit.

- (d) In designing the support structure the user must take into account the following factors in both operating and test conditions, and the possibility of more than one of these loads occurring simultaneously:
- Internal pressure from the contained fluid
 - The mass of the contained fluid
 - Traffic wind and earthquake loading
 - Reaction forces and moments which result from the supports, attachments, other piping etc.
 - Fatigue etc.
 - Vibration
 - The potential to overstress the flanges.
- (e) In earthquake conditions, CRP is unable to guarantee the integrity of its products, and the user must take suitable precautions to guard against potential product failure and its consequences in these circumstances.
- (f) It is the responsibility of the user to ensure that suitable pressure relief and other appropriate safety devices have been included in the design of the entire pressure system, and that discharges from such equipment have been considered.
- (g) If the products are to reach temperatures during operation or test which would be harmful to individuals, should they come in contact with the products in these conditions, it is the users responsibility to overcome this hazard.
- (h) The user is responsible for ensuring that suitable provision is made to allow for any necessary draining and venting of the system.
- (i) The user is responsible for ensuring that suitable provision is made to allow for isolation of take off pipes if these are of a size to present a significant risk. In addition, the risk of inadvertent discharge must be minimised, the take off points must be clearly marked on the permanent side, indicating the fluid contained. Each valve is supplied with a lock out device. It is the users responsibility to ensure that this device is used correctly. Each valve also is supplied with an operating procedure. The user is responsible for ensuring that this procedure is correctly followed every time the valve is used.
- (j) While the valve bodies & handles are manufactured from 316L stainless steel, the user is responsible for the maintenance of the exterior of the products to prevent corrosive attack.
- (k) Where, under reasonably foreseeable conditions, the allowable pressure limits of the products could be exceeded, the user is responsible for the fitting of suitable protective devices, and, if appropriate adequate monitoring devices.
- (l) By their nature, PFA and PTFE are not fire proof (the PFA lining and PTFE seals will melt under extremes of heat), and therefore, if appropriate, the user must consider how to meet any damage limitation requirements in the event of a fire.
- (m) The user is responsible for ensuring that the sampling valve is used in line with the Operational Sequence as supplied with the Sampling Valve, and that the operator is fully protected against the product being sampled.
- (n) Although the sample bottle vent is larger in cross sectional area than the bottle inlet, it is still possible that the sample bottle may become pressurised. Therefore, the user must consider possible pressurisation of the sample bottle by the contained fluid when specifying the bottle.

In cases of uncertainty on the part of the user, please contact the manufacturer for advice on any of the above.