

# Pig Launcher & Receiver

## APF-PLR



APADANA PETRO FARAYAND

Knowledge is our difference

Apadana Petro Farayand offers complete Pig Launching and Receiving Systems to meet the pipeline operator's pigging needs. Our launchers and receivers can be designed to accommodate scraper pigs, sphere pigs or smart pigs, or any combination of the three. These system packages include the Launcher / Receiver, Closure, Pig Signal, Bypass / Kicker Piping, Valves, Handling Equipment if required, and Skid Mounted to ease field installation.

## Introduction

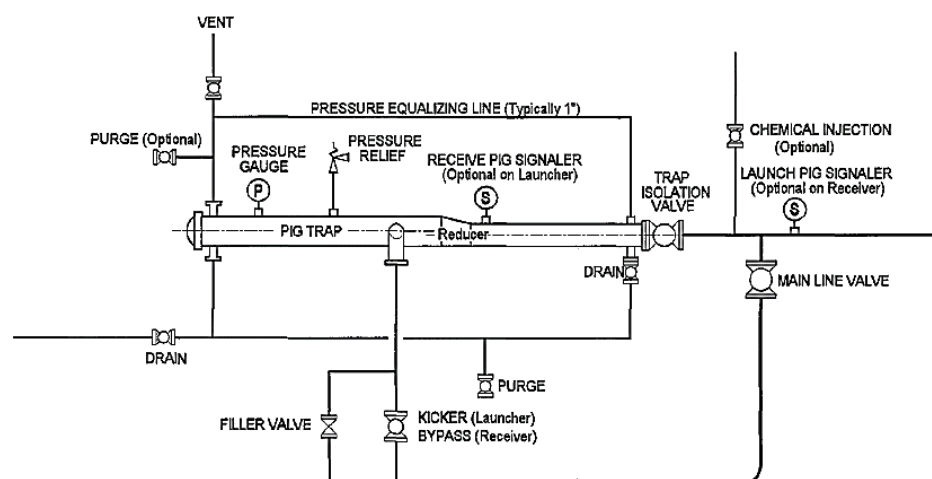
All pipelines need to be pigged at some time in their operational lives, whether this is as part of a regular frequent cleaning pig program, as a precursor for an inspection tool or maintenance task, or for pipeline conversion to allow it to carry a different product.

Launchers are designed to insert the pig into the start of the pipeline and receivers are designed to remove the pig at the end of the pipeline. These devices are commonly referred to as pig traps. Pigs are used in oil and gas pipelines for a number of reasons. These reasons include, but may not be limited to, cleaning interior pipe walls, inspection, separation of product batches, and dewatering. Proper use of pig traps prolongs the life of a pipeline, improves safety of operation, reduces operational costs, reduces product loss, and protects our environment. The main body of the pig trap, sometimes referred to as the 'barrel', consists of a section of pipe which is larger than the nominal diameter of the pipeline. This section houses the pig and, being oversized, allows the pig to be inserted or removed more easily.

## Signalers

It is important that the position of a pig be known when it is being launched or received. This is usually done with a signaling device mounted on the pipeline. At the launching end of the pipeline, the signaler is mounted downstream of the tee where the main stream joins the pipeline. This not only indicates that the pig has left the launching trap, but that it has also passed the tees and other downstream connections and is actually in the pipeline.

At the receiving end of the pipeline, a signaler is needed on the nominal bore section of the trap. This signaler will indicate that the pig is completely within the trap and the trap isolation valve can be closed without risk of damaging the pig. This means that the signaler must be located downstream of the trap isolation valve a distance equal to or greater than the length of the pig being run.



## Key Features

Our standard Launching and Receiving Systems are complete packages. All components are assembled, tested and ready for field installation. Main features of our packages are:

- Carbon Steel Body
- Units are furnished with quick opening closures
- Cover gasket
- Vent, drain, pressure, Pig Sig. connections
- All nozzles are properly sized and located
- Bypass piping is fabricated and connected for sure fit-up
- All units are sandblasted and prime coated
- Handling equipment is offered for handling larger pigs
- Units designed, tested and inspected to meet customer's code requirements
- 100% weld inspection

All units are designed and fabricated by Apadana Petro Farayand according to relevant required pipeline and vessel design codes including:

- ASME U Stamp Division 1 & 2
- ASME VIII
- NACE
- BS 5500
- ASME B31.3, B31.4, B



## **PIG LAUNCHING AND RECEIVING**

Traps are a means of access to the inside of the pipeline. It is therefore a fundamental requirement that all valves must give a good seal and be in good working condition, so regular maintenance is essential. There must be good access to the trap whether it is for launching or receiving. It is almost impossible to prevent spillage of some of the product along with the sludge, dirt and debris removed from the pipeline. Provision must therefore be made to handle this waste material in a safe manner. In addition to the fact that it is often flammable, it may cause other hazards in the work area and grating or other means must be provided to prevent slipping and possible falls by the operating personnel. Connections that could result in spillage should be piped so that the waste material is taken away from the work area. Drain connections in particular must be piped to a container designed to allow for the safe disposal of the waste. Pigs over about 12" are usually too heavy to be handled manually, so lifting equipment should be provided to move the pigs between the traps and the vehicle which is used to transport them. These lifting devices are often pneumatically or hydraulically operated to avoid having electrical equipment in a potentially hazardous area.

**IMPORTANT NOTE:** The following is not intended to be a definitive set of procedures which are applicable to all pipelines, but simply a framework which could provide the basis for developing formal operating procedures. Operating procedures must be developed separately for each pipeline, taking into account all the variables such as the product, station design, valves, pressure, line

### **Typical Pig Launching Procedures**

Company policies vary as to how the trap is normally left after the previous use. After a pig is launched, one procedure is to leave the main line trap valve open and the trap pressurized until preparing for the next usage. Another procedure is to close the trap isolation valve, drain the trap and leave it with the drain and vent open until the next time of use. A third method, which requires a thermal pressure relief valve to be permanently installed, is to close the trap isolation valve, drain the trap and leave it with the drain and vent closed until the next time of use. It is usually considered to be important that the trap is not blocked closed when full of product, especially a liquid, even when a relief valve is fitted, as changing temperatures might create pressures that are not within the design limits.

The first step then is to verify whether there is any internal pressure in the trap before commencing any part of the launch procedure. Note that for safety or operational reasons, there may be more than one valve on any of the connections, in which case all of them should be opened or closed as the case may be. Then, referring to the drawing a typical launch procedure would be as follows.

Step 1 Verify that the trap isolation valve is closed.

Step 2 Verify that the kicker valve is closed.

Step 3 Open the drain valve(s) to drain the trap of any residual product.

Step 4 Open the vent valve to assist the trap to drain and to verify that the trap is depressurized.

Step 5 Check pressure gauge(s) on the trap to verify the trap is depressurized.

Step 6 If hazardous products have been in the trap, purge them with an inert product.

Step 7 Remove the safety lock on the trap closure.

Step 8 Open the trap closure.

Step 9 Install the pig with the lead cup firmly in contact with the reducer between the barrel and the nominal bore section of the trap.

Note: Normally, only one pig will be installed within the trap for launching at any one time. An automated trap for pigs or spheres will require additional steps to control the launching of the pigs, one at a time.

Step 10 Clean the closure seal and the other sealing surfaces, then shut the closure door

Step 11 Install the safety lock on the closure.

Step 12 Close the drain valve(s).

Step 13 Slowly open the filler valve on the kicker valve bypass line, if one has been fitted. If not, then slightly open the kicker valve to fill the trap.

Note: The flow through the kicker line into the trap should not be more than the capacity of the pressure equalizing line on the trap, otherwise the pig may move forward during the filling procedure.

Step 14 When the trap is filled, close the vent valve

Step 15 Leave the filler valve (or the kicker valve) open until it has been verified that the pressure in the trap has equalized with the pipeline pressure, then close it.

Step 16 Fully open the trap isolation valve to the pipeline.

Step 17 Obtain permission to launch the pig

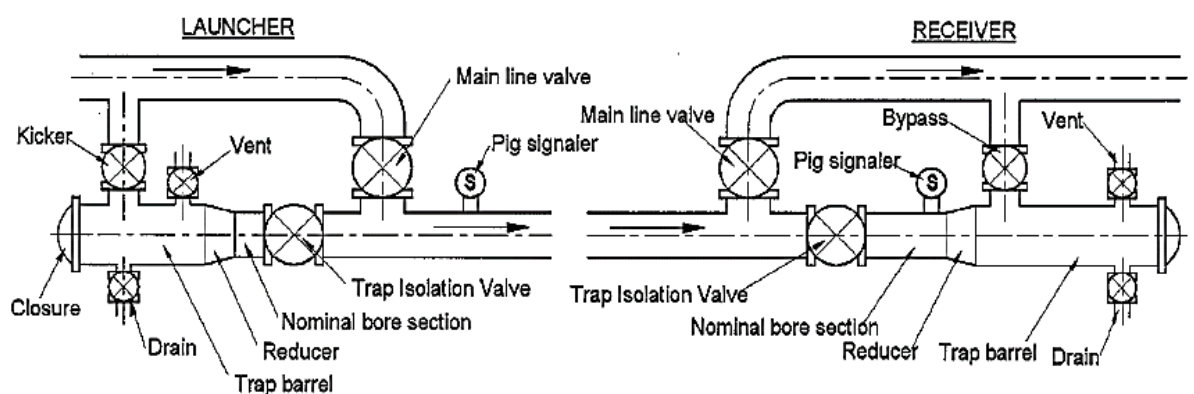
Step 18 Fully open the kicker valve.

Step 19 Partially close the main line valve to create flow through the launching trap.

Monitor the pig signaler and when pig has passed, immediately open the main line valve fully.

Note: If the pipeline flow is so low that the flow through the pressure equalizing line on the trap plus the leakage around and through the pig prevents it from launching, it is advisable to wait until higher flow rates are available for pigging. Pigging at very low flow rates is possible but it is not very effective and it is not recommended.

Step 20 The trap may be left in this condition or if it is to be left depressurized, repeat Steps 1 through 6.



### Typical Pig Receiving Procedures

At receiving traps also, company policies vary as to how the trap is normally left after the previous use. The options are the same as they are for the launcher but are repeated for ease of reference. After a pig is received, one procedure is to leave the trap isolation valve open and the trap pressurized until preparing for the next usage.

Another procedure is to close the trap isolation valve, drain the trap and leave it with the drain and vent open until the next time of use. A third method, which requires a thermal pressure relief valve to be permanently installed, is to close the trap isolation valve, drain the trap and leave it with the drain and vent closed until the next time of use. It is usually considered to be important that the trap is not blocked closed when fill of product, especially a liquid, even when a relief valve is fitted, as changing temperatures might create pressures that are not within the design limits. The first step is always to verify whether there is any internal pressure in the trap before commencing any part of the receiving procedure. Also, again note that for safety or operational reasons, there may be more than one valve on any of the connections, in which case all of them should be opened or closed as the case may be. Then, referring to the drawing, a typical receiving procedure would be as follows.

Step 1 Check the pressure within the Receiving Trap. If it is already at full pipeline pressure, proceed to Step 2. If it is partially pressurized, it is usually best to drain down completely before refilling, so proceed as follows

- a) Verify that the trap isolation valve is closed
- b) Verify that the bypass valve is closed.
- c) Open the drain valve(s) to drain the trap of any residual product.
- d) Open the vent valve to assist the trap to drain and to verify that the trap is depressurized. When the trap is completely depressurized, proceed as follows
  - A) Check that the vent valve is open
  - B) Close the drain valve.
  - C) Slowly open the filler valve on the bypass line piping, if one has been fitted. If not, then slightly open the bypass valve to fill the trap.
  - D) When the trap is filled, close the vent valve.
  - E) Leave the filler valve (or the bypass valve) open until it has been verified that the pressure in the trap has equalized with the pipeline pressure, then close the filler valve (if used).

step 2 Fully open the bypass valve.

step 3 Fully open the trap isolation valve.

Step 4, Monitor the pig signaler for pig arrival.

Step 5 Partially close the main line valve to ensure that the pig is completely within the trap, then immediately fully open it again.

Step 6 Close the trap isolation valve.

Step 7 Close the bypass valve.

Step 8 Open the drain valve or valves.

Step 9 Open the vent valve.

Step 10 Check pressure gauge(s) on the trap to verify the trap is depressurized.

Step 11 If the trap contains a hazardous product, purge with an inert product.

Step 12 Remove the safety lock on the trap closure.

Step 13 Open the trap closure.

Step 14 Remove the pig from the receiving

Step 15 Clean the closure seal and the other sealing surfaces, then shut the closure door.

Step 16 Install the safety lock on the closure.

Step 17 If the trap is to be left unpressurized, it may be left in the current condition. If it is to be left pressurized, repeat Steps A through D of Step 1, and leave the filler and/or the bypass valve open.

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