



# SAMPLING CASE STUDY

## SPECIAL VESSEL SAMPLERS

### FOR OILFIELD CHEMICAL PRODUCER

#### Sampling

A sample taken from a process pipeline or reactor should represent the exact constituents of the process without any contamination. Contamination of a sample can create incorrect test results and cause further process problems. DDPS' range of samplers has several design features built in to overcome contamination problems and provide a true representative sample. Our range of sample dispensing options and secondary containment solutions are designed to suit the process needs of the pharmaceutical, chemical, biotechnology, food and beverage and petrochemical industries. Sampling solutions of all levels of sophistication are available from simple manual sampling to remote automated sampling and analysis systems. Toxic, flammable and corrosive media are safely sampled using systems with all wetted parts in a variety of materials of construction. Types of samplers available include:

***Inline Samplers:*** designed to take representative samples from process pipeline. Inline Samplers are commonly used where chemicals are being introduced into the process or between process steps where it is difficult to obtain a sample from a vessel without creating hazards or additional contamination.

***Surface Mounted Samplers:*** a new type of sampling valve which can be bolted on to the side or bottom of a vessel or large pipeline. Surface mount samplers are commonly used for taking samples from large pipelines or from the side-wall of vessels.

***Vessel Mounted Samplers:*** allows samples to be taken from a dip pipe mounted at the top of a vessel. The vessel sampling systems are ideal for the sampling of batch processing within reactors or storage vessels holding intermediate product or bulk chemicals.

The following case study demonstrates our ability to create a customized solution that meets the specific needs of the customer. For further information please visit the sampling section of our website: [www.ddpsinc.com/sampling](http://www.ddpsinc.com/sampling)

#### The Customer

A speciality chemicals producer of oilfield chemicals belonging to one of the world's leading oil service companies.

This producer of scale inhibitors, drilling mud chemical additives and speciality oilfield chemicals through batch reactors at elevated temperatures was carrying out an expansion and upgrading of its plant to meet increased levels of oilfield activity arising from the rising barrel price of crude oil.

#### The Problem

The chemical and physical properties of the end products are critical; any off specification materials would cause delay and possibly interruption of oilfield operations with potentially huge consequential losses. The ability to frequently sample hazardous and flammable materials at elevated temperatures throughout the batch production process was absolutely critical.



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## The Solution

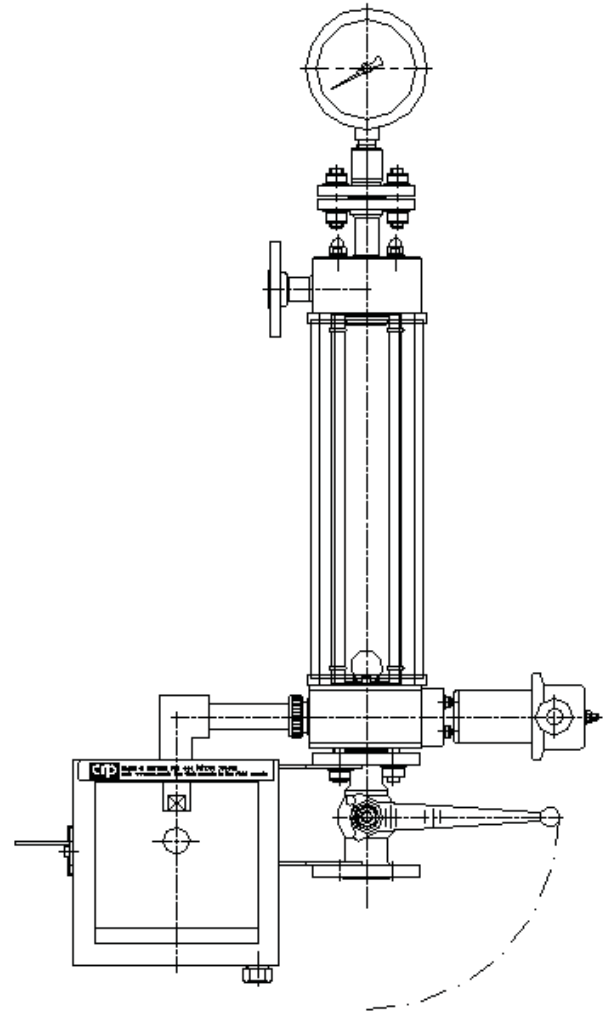
After consultation with the end user and their appointed EPC contractor, 12 customized vessel sampling units were designed and supplied in two variants to meet the specific process conditions while giving the operator the ability to take accurate and repeatable samples, minimizing disposal costs and limiting plant hazard.

The first variant was designed to take samples at temperatures of up to 180°C, with a pressure envelope of full vacuum to 10 barg, and wetted parts of 316 stainless steel, PTFE, and Chemraz. This comprised a stainless steel ball valve for vessel isolation, an extra heavy wall borosilicate glass sight glass with FEP safety shield suitable for high temperature operation. The sight glass is fitted with a hollow ball PTFE float which seals against the top seat to prevent accidental exposure of product into the vacuum system. The top end of the sight glass comprised a stainless steel manifold with a pressure gauge and a port to allow a separate manifold with nitrogen, vacuum and wash liquor connections to be attached. The sample dispensing system was through a globe type valve with no internal dead legs to prevent product hold up. The valve was operated with a twin action spring return safety handle. The samples were dispensed into a stainless steel safety cabinet with laminated glass window to house the sample collection bottle. The cabinet also had a large latch to allow it to be operated with a single gloved hand, a vent connection to allow any fumes to be drawn away to the plant scrubber system, and a bunded base with drain connection to allow any spills to be contained and collected safely.

The second variant was in many respects similar to the first, but designed to take samples at temperatures of up to 280°C, a full 100°C hotter, while maintaining the full vacuum to 10 barg pressure envelope. This higher temperature rating necessitated the replacement of the tubular sight glass with a stainless steel sample collection chamber, featuring a high temperature bullseye sight window, and a custom designed high temperature PEEK float. To ensure visibility of the float, a top mounted luminaire was also fitted. Due to the temperature, it was impossible to use a globe type sample outlet valve, and this was replaced with a customer site standard ball valve. Although this created a dead leg on the outlet flow path, this was overcome by the use of a strict flush and purge regime after each sample was collected. To make flushing easier, the

standard bunded base in the sample cabinet was replaced with a tun dish outlet, so that wash liquor could be flushed straight through without the need of additional sample bottles to collect this liquor.

By custom designing the components to meet the very hazardous operating conditions the client was provided with safe and representative sampling for these critical applications.



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