

SAFETY MEMO

April 11, 2022 – Safe Sampling



Did You Know?

Introduction

Process sampling is the task where operators collect a fixed volume of process liquid, gas, or solids for analysis. Process sampling is a hazardous task that exposes operators to process conditions with potential risk of bodily harm. Therefore, it is essential for operators to consider safe sampling methodologies when performing sampling. This safety memo provides an overview of hazardous sampling situations, risk management strategies, and engineering design considerations.

Hazardous Sampling Situations

Process sampling is used to validate systems and their respective outputs. Process sampling typically occurs during periods of system commissioning, troubleshooting, operator inspections and quality audits. During sampling individuals are exposed to hazards which can be best categorized as either ergonomics or exposure.

Ergonomic hazards are related to the access and egress methods of sampling. Sampling locations vary by process but are often found within equipment danger zones near energized process equipment. As a result, operators may encounter non-optimal access and egress conditions such as tight areas near moving parts, hot surfaces, and pressurized vessels. Figure 1 shows a typical production skid with non-optimal access and egress to sampling locations.

Exposure hazards are related to inadvertent contact with process substances. Exposure hazards vary by process but are based on chemical composition, the temperature, and the pressure of the process at the sampling point. Exposure risk is increased in situations of non-optimal testing infrastructure and procedure. As a result, operators may be exposed to toxic levels of process substances during sampling.

Risk Management

Process sampling presents many health and safety hazards to the operator. It is essential that the hazards and pertinent risk outcomes are managed effectively. The priority should be to avoid the risks by enacting safety procedures and ensuring the functional status of both testing equipment and infrastructure. Risk avoidance can be enhanced further using engineering controls as discussed in the design considerations section below.

The second priority should be to mitigate the risk using PPE such as hard hats, safety suits, and appropriate testing equipment. Risk mitigation can be enhanced further using job hazard analysis.

Engineering Design Considerations

Process sampling requirements should be collected during the preliminary phase and integrated into the detailed design phase of a project. Considerations for the sample size, frequency, and process being sampled should be made. Additional considerations should be given towards engineering controls such as toxicity detection, ventilation requirements, rinse stations, emergency stops, and egress guards. Finally, the design of the sampling port must be adapted according to the physico-chemical properties of the sample such as its viscosity, but also according to the pressure and temperature of the process in order to minimize the inherent risks.

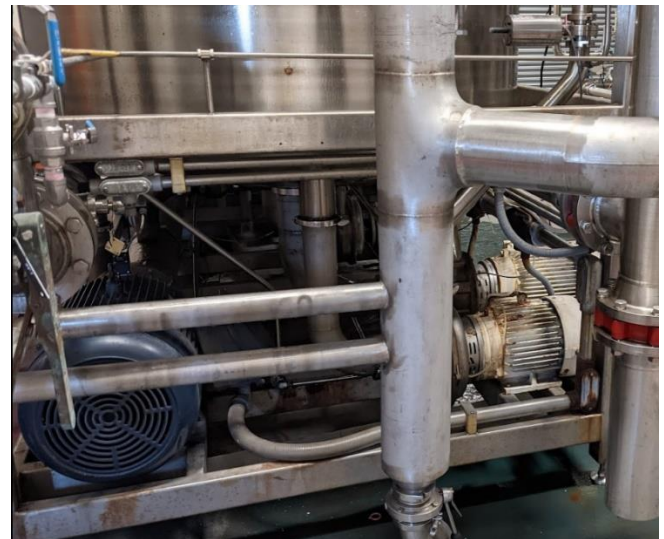


Figure 1 – Non-Compliant Production Skid

