Closed Loop and Open Loop Sampling Systems

FORBES MARSHALL

Closed Loop and Open Loop Sampling Systems

Forbes Marshall provides customised solutions for gas and liquid sampling. Samples in petroleum refineries, petrochemical complexes and chemical industries are either flammable or hazardous. Forbes Marshall's closed loop sampling system provides a safe means to sample these fluids.

Since the final product produced in the petrochemical industry is required to be of high standard quality, the need to analyse the process at various point is very essential.

Further to this, samples extracted can be collected in a sample cylinder or sample bottles for lab analysis with an ease of operation, handling and safety of the operator.

These sampling systems are available in flow through to vent and flow through to process plus vent configuration and are designed to handle a wide range of fluids like

- High pressure gases
- Hot gases
- Hot flashing liquids
- Toxic fluids
- Light and medium distillates

Salient Features

Safety

Sample cooling for high temperature and pressure fluids

Recommended for phase changing fluids

Non-return valve in the venting helps avoid back-flow of sample in case of hazardous/flashing liquids

Quick disconnect coupling for safe removal and assembly without backflow of sample cylinder

Seamless spun sample cylinder (no welds, less corrosion) for safe collection of upto1000cc of sample

Pressure gauge to indicate thorough sample collection

Metallic braided hose with PTFE core to handle sour service - added safety for the operator

Dip tubes and rupture disc for protecting equipment or system from over pressurization or potentially damaging

Vacuum conditions

Expansion chamber

Operator safety including safe handling of sample while ensuring representative sampling

No contact between sample and environment leading to a safer environment

Sample unloading station

Representative sampling

Fast looping option

Heat tracing for wax forming and viscous services

Pressure indications

Purge sampling

Quality

NACE

IGC

HIC for valves

IBR form IIIC for pressure parts

PMI testing

Inhouse hydrotesting

Sulfinert coating

WPS PQR

Special painting requirements (for Refinery Sample Cooler)

External painting

Internal painting (epoxy, powder coating as per requirement)

Internal liquid epoxy lining to the cooler shell

Low Pressure Liquid Sampling Application

Liquid samples are collected for laboratory analysis by a bottle configured sampler system.

Injection manifold

Injection manifold with vent port

Glass Bottles with automatically sealed septum

Fixed volume cylinders

Suitable for high viscous liquids

Customized end connections

High Pressure Low Temperature Liquid / Gas Sampling Application

High pressure low temperature liquid/gas samples are collected for laboratory analysis by a cylinder configuration system.

Closed sampling

Fast looping

Fixed volume cylinders

Dip tube and rupture disc for toxic/hazardous sample

Expansion chamber

NRV at outlet

Pressure gauges at inlet and outlet

Representative sample

Clean and hygienic sample collection

Customized end connections

For High Temperature Sampling Application

High temperature liquid samples are collected for laboratory analysis by a cylinder configuration system along with sample cooler

Sample cooler

Fast looping

Closed sampling

Fixed volume cylinders

Dip tube and rupture disc for toxic sample

Expansion chamber

NRV at outlet

Temperature and pressure gauges at inlet and outlet

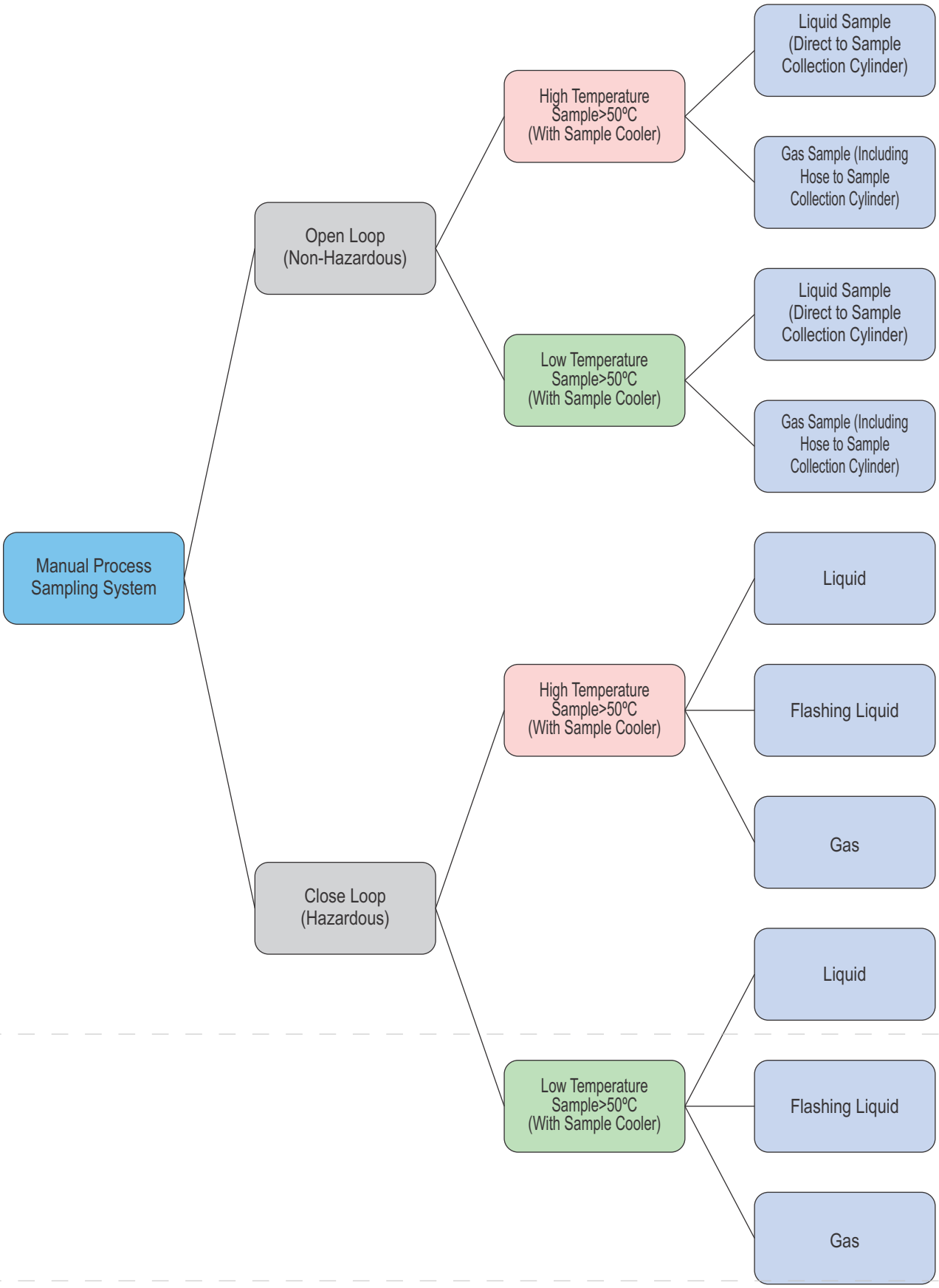
Representative sample

Clean and hygienic sample

Thermal shut off valve for temperature protection

Special painting requirements for sample cooler

Classification Chart



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Sample Cylinder

Spun type Weld-less Sample cylinder, welded cylinder is not recommended due to following reasons:-

So far welded assembly of cylinder is considered, over the time of operation there are chances of corrosion due to process fluid, and this is not safe in view of operator safety.

Unnecessary corrosion at welded joints in cylinder assembly leads in endangering operator safety

Spun type weld-less sample cylinder is suggested considering above reasons, ease of maintenance, operators safety.

300cc/500cc (for gas/liquid sampling) or as per specification

DOT specification

Carrying handle

MOC: SS304 / SS316 / SS316L / Inconel / Monel / Hastelloy

Valves and Fittings

Each CLS system shall have its own isolation valves both at the inlet and outlet connections, for controlling sample flow, venting, bypass and isolating the system from the process.

MOC: SS316 / Inconel / Monel / SS316L / Hastelloy

Quality: IGC, NACE, HIC, 3.1 Certification, Dual certification as applicable

Sample Racks/Cabinets/Enclosure

Complete sampling system shall be mounted on fabricated racks/cabinets/enclosure as per requirement

MOC: MS/CRCA/FRP/SS304/SS316

Mfg standard epoxy powder coating or other project special painting requirement as applicable

Sample Cooler

Standard – DHx-series and CoolMax series

Special refinery sample cooler (single helix coil in shell type) for high temperature fluid samples

Quality: IBR, NACE, IGC, 3.1 Certification for wetted parts

MOC: CS / SS304 / SS316 / SS316 / Inconel / Duplex / Super duplex

Painting: External painting for cooler shell, internal painting for project requirement as applicable

End connections: Double ferrule for standard and flanged for special cooler

Flexible Hoses

MOC: PTFE Core with SS braiding/SS316 Core

End Connections

Double ferrule compression type

Flanged – class and rating as per process details

Special Requirements

Hot Insulation for personal protection

Handheld aspirator for vacuum or very low pressure application

Chemical filters

6-Port valve instead of manifolds

Solution for UOP design with better aspects

Unloading stations for liquid/gas samples

Pressure gauge: high pressure gauge (for gas applications with different pressure ranges)

Double block and bleed valve (DBB) for system isolation

Pressure rating: Up-to 6000 psi or as per specification

Flexible hoses with quick disconnect coupling for better operator safety

What Forbes Marshall Can Do For You?

With a lot of experience in providing systems for various processes for metering, measuring, analysis, control and other requirements in oil and gas industry we are in better position to understand your process.

With more than 60 years experience in Steam Engineering and Control Instrumentation, we are better placed to understand the thermodynamics, piping design, welding practices and other mechanical aspects of design with inhouse manufacturing capability.

With more than one decade of experience in the field of sampling system for oil and gas sector and petroleum Industry, with around 100 references, we have expertise and infrastructure to suffice various sample handling applications such as hazardous/high temperature fluids.

Safety First

Safety Chart

Symbol	Area Of Concern	Forbes Marshall Solution
	High Temperature Samples	Forbes Marshall designs sample coolers for proper cooling of sample for equipments and operators safety before collecting sample for lab analysis
	Flammable Fluids	Forbes Marshall designs sampling system with fast loops and venting arrangements before collecting for analysis
	Humane Hazard (Toxic Fluids)	Forbes Marshall designs sampling system with safety interlocks for safety of operator collecting toxic liuids, flammable liquids
	Corrosive Samples	Forbes Marshall designs system with correct metallurgy for collecting sample fluids for handling corrosive fluids
	Fumes	Forbes Marshall designs system with correct venting, draining and purging arrangement

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