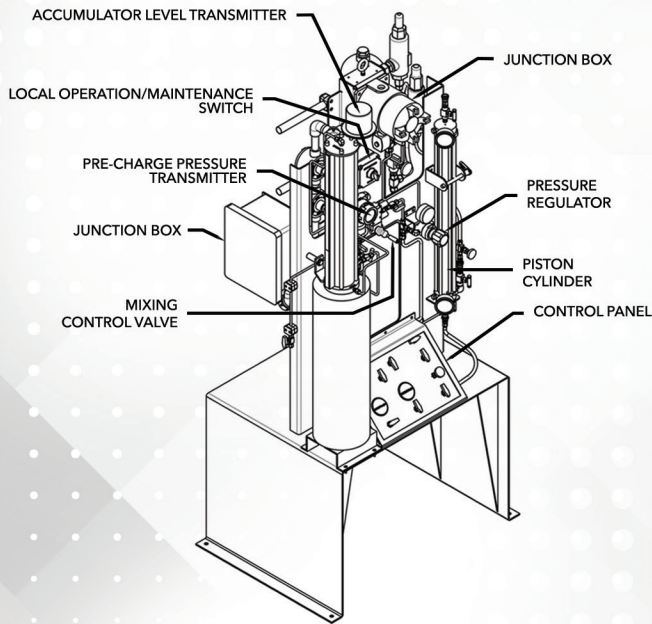


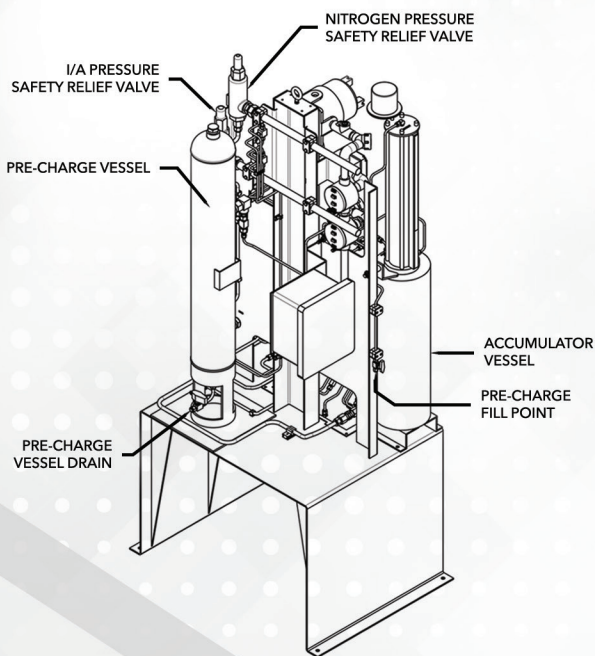
INSIGHT

ANALYTICAL

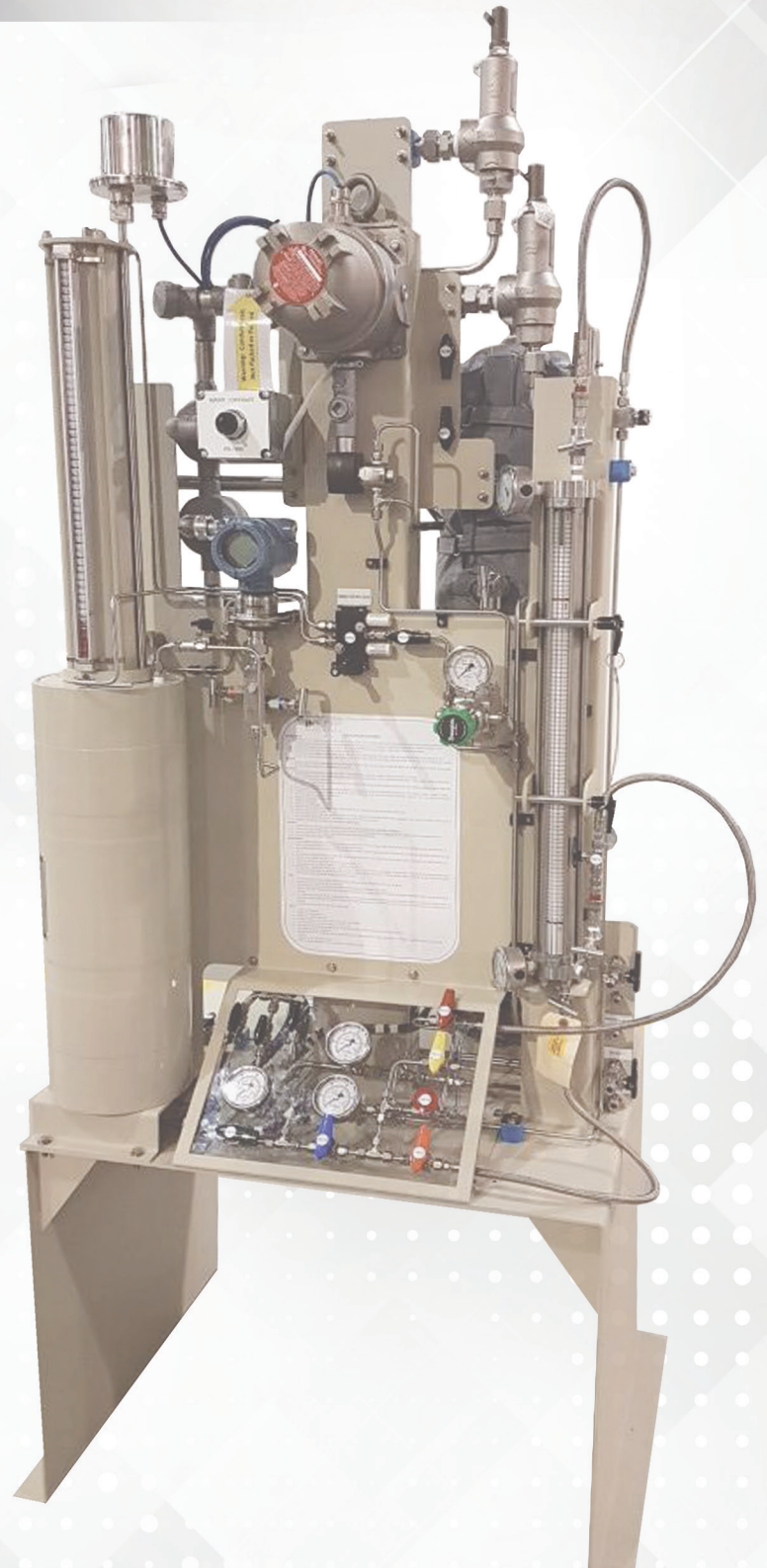
COMPOSITE SAMPLING FOR LIQUID HYDROCARBONS



FRONT



BACK



COMPOSITE SAMPLING

Composite samplers are designed to sample hydrocarbon liquids with densities of 780-880 kg/m³ (such as crude oil), condensate with densities of 650-750 kg/m³, and Natural Gas Liquids (NGLs) with densities of 350-650 kg/m³. Composite samplers are capable of collecting thousands of individual samples that are all stored in the accumulator portion of the sampler. This collection of samples represents a composite sample of the process over time.

Insight Analytical's composite sampler includes a mixer and an integrated constant pressure (piston) cylinder for NGLs and high vapor pressure samples. This design allows for filling directly from the accumulator into the cylinder after mixing. This improves sample integrity by avoiding the need to connect cylinders to the accumulator with tube fittings and creating the potential for ambient air to contaminate the sample. This also simplifies the composite sampler and reduces sampling errors when piston cylinders are filled for off-site analysis. The composite sampler is designed to operate with Insight's own piston cylinders or third-party piston cylinders.

SINGLE PHASE SAMPLING

One of the most important considerations when sampling is the need to maintain a single phase sample at all times. Sufficient pressure is required to keep lighter hydrocarbons in the liquid phase. The Insight composite sampler achieves single phase sampling by maintaining the "pre-charge" pressure for NGLs in both the accumulator and the piston cylinders. When actuated from a customer supplied source, the sample pump pushes against this pre-charge pressure to fill the accumulator under pressure. This pre-charge pressure ensures that lighter hydrocarbons (like ethane or propane) do not flash into the vapor phase when filling.

SAMPLING

The integrated sample pump is pneumatically actuated from a customer supplied signal. This sample is then collected in an accumulator until 80% full. A level transmitter and pressure transmitter are included to provide analog (4-20 mA) signals to a customer supplied PLC or flow computer/RTU. This allows for automated notification of when the accumulator is full or when pre-charge pressure is lost. A position switch provides status input to the customer supplied PLC/RTU to indicate when the sampler is in operation or maintenance mode. This ensures that safe maintenance can occur without sampling. Color coded valves and a schematic (P&ID) assist operations personnel with mixing, sampling and piston cylinder replacement. All equipment is mounted on a raised platform to allow for simplified operation and maintenance. The entire design follows API (American Petroleum Institute) Report 8.2 for composite sampling including tubing slope and diameter.

FEATURES & BENEFITS

Raised platform for easier operation and maintenance

Optional heated, insulated enclosure with gas detection and temperature control for outdoor mounting in cold climates

Positive displacement pump with adjustable sample injections per stroke

Sample accumulator with mixer to improve sample integrity and minimize stratification prior to filling piston cylinders (ie: oil and water)

Level transmitter and visual level indicator to indicate accumulator fill position locally or remotely with analog output for customer supplied PLC/RTU

Pressure transmitter to indicate pre-charge pressure in the accumulator and piston cylinders for improved sample integrity of NGLs and lighter hydrocarbon samples

Sample pump can be mounted locally or remotely

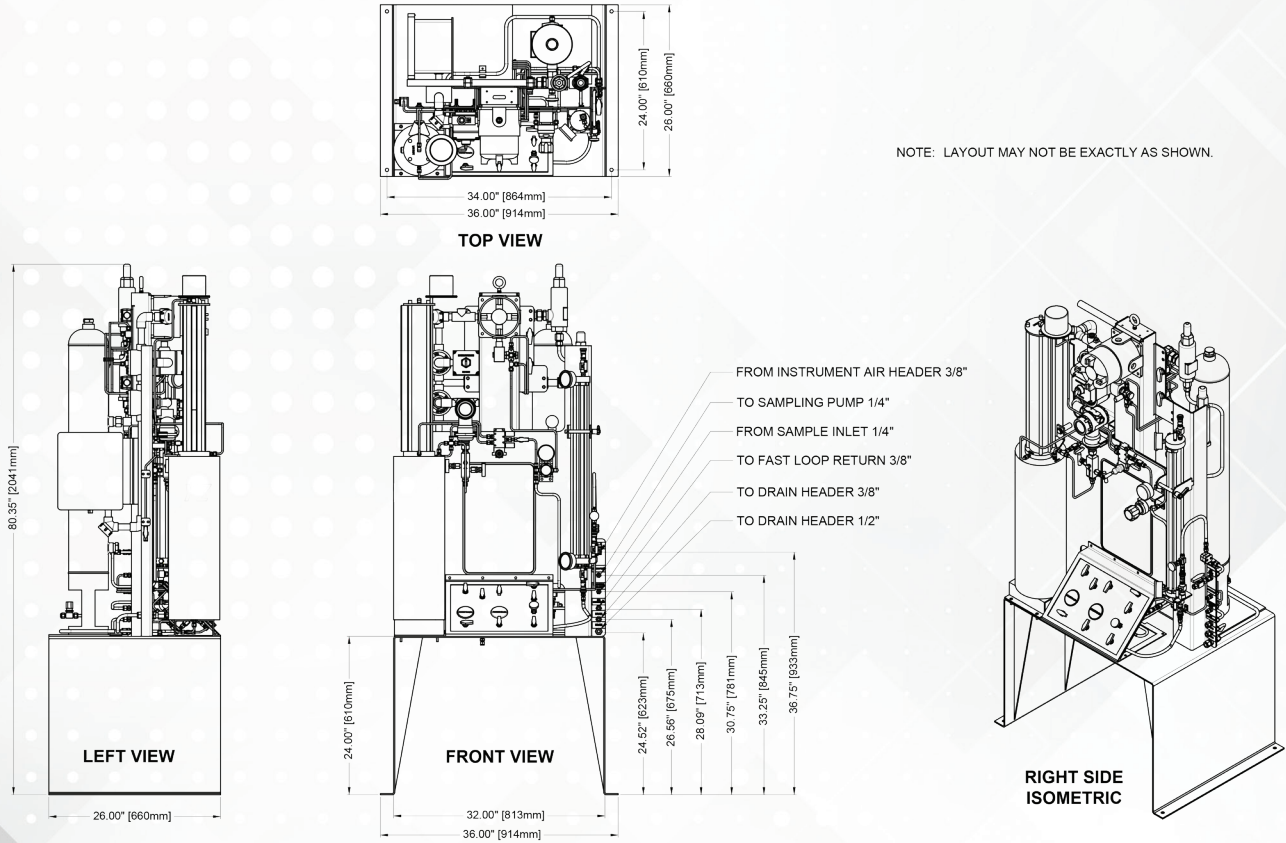
Accumulator volumes of 1.5, 3 or 5 gallons (5.7, 11.4 or 18.9 liters)

ANSI 600# Piping Specifications

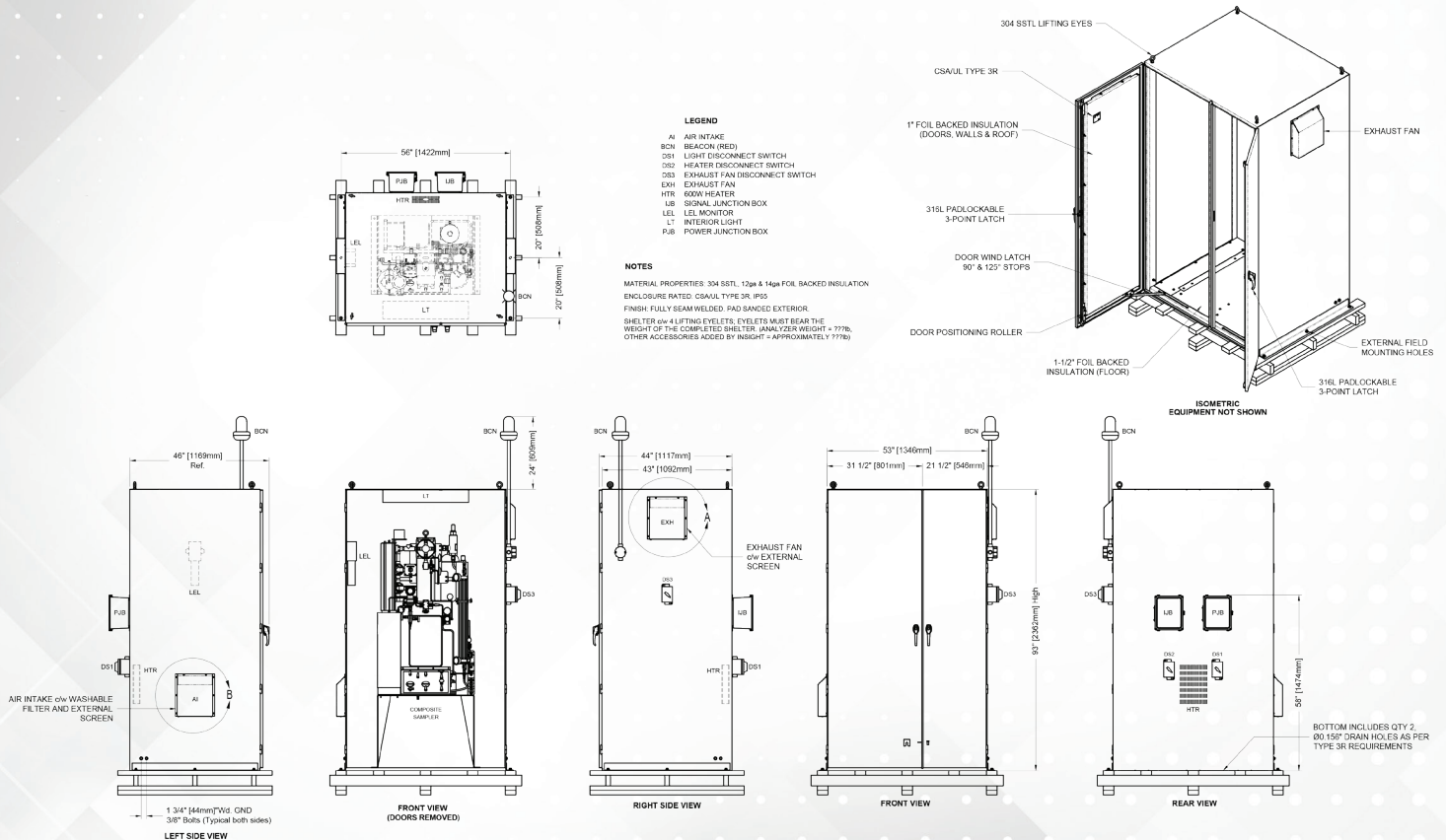


PHYSICAL DIMENSIONS

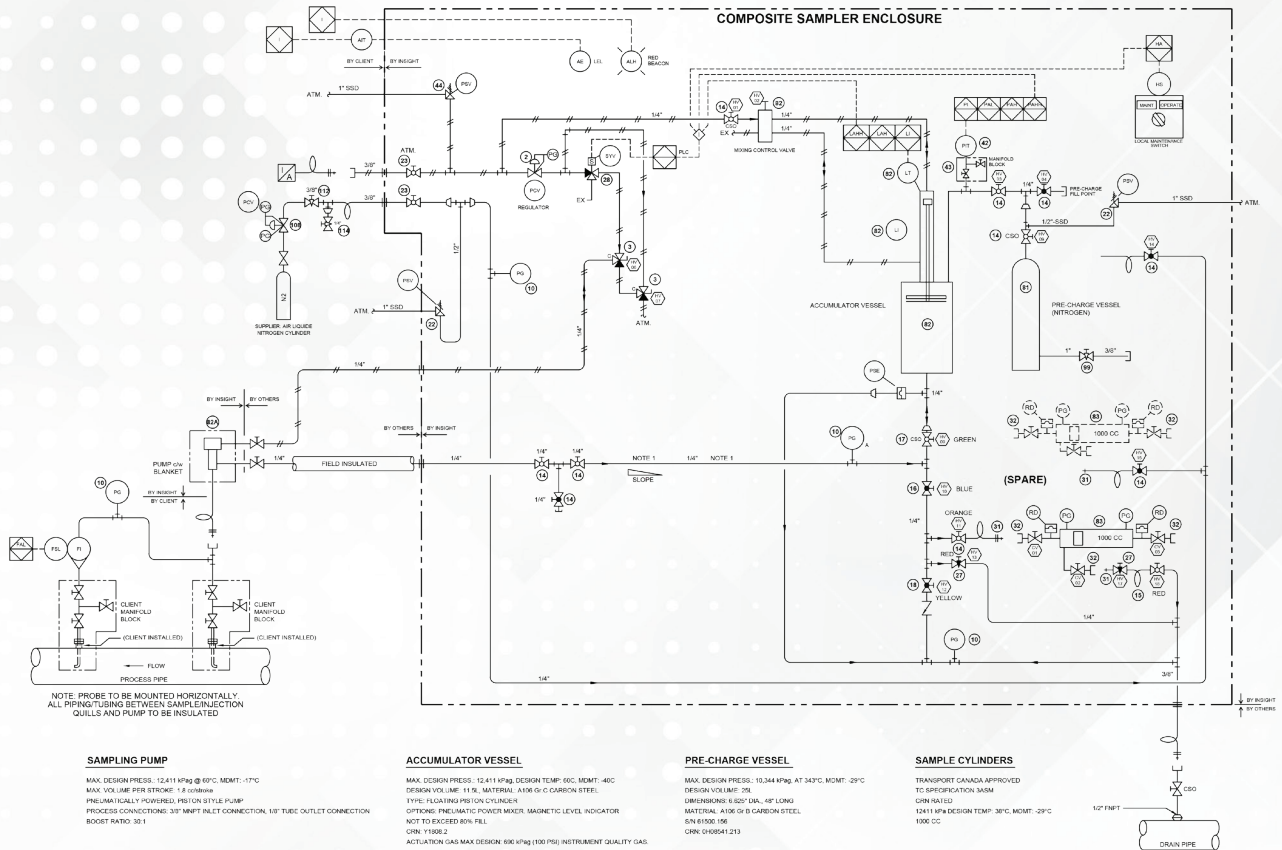
Standard Configuration



Optional Heated Enclosure



PROCESS & INSTRUMENT DRAWING



SPECIFICATIONS

DESIGN CONDITIONS (PROCESS):

Maximum Operating Pressure	1,440 psig (9930 kPa)
Density	600 to 900 kg/m ³ (37.5 lbs/ft ³ to 56.2 lbs/ft ³)
Vapor Pressure	8.7 to 21.7 psig (60 to 150 kPag)
Piping Specifications	600# ANSI
Service	Liquid Hydrocarbons (crude oil, condensate, or NGLs)
Actuation Gas Max Design	67/100 psig (690 kPag) Instrument Air or N ₂
Actuation Gas	100 psig (690 kPag) Instrument Quality Gas or N ₂

DESIGN CONDITIONS (AIR):

Max Operating Pressure	100 psig (690 kPag)
Area Classification	Class I, Div/Zone 2 IIB T3
Optional Outdoor Enclosure	Class I, Div/Zone 1 IIB T3, Enclosure rating NEMA 4X

PROCESS CONNECTIONS:

Sampling Pump	3/8" NPT inlet connection, 1/8" tube outlet connection
Pump Displacement per Stroke	Adjustable from 0.5 to 1.8 cc/stroke
Accumulator Vessel	Actuation gas max design 100 psig (690 kPag) Process design pressure 1,800 psig (12,411 kPag)

TUBING:

1/8" x 0.028" 316LSS
1/4" x 0.035" 316LSS
3/8" x 0.049" 316LSS
1/2" x 0.049" 316LSS

POWER SUPPLY OPTIONS:

Pneumatic	120 VAC @ 1 Amp
Actuation Signal	Customer supplied pneumatic pressure

I/O:

Level	4-20 mA
N ₂ Pressure	4-20 mA
Operation/Maintenance Switch	Dry Contact