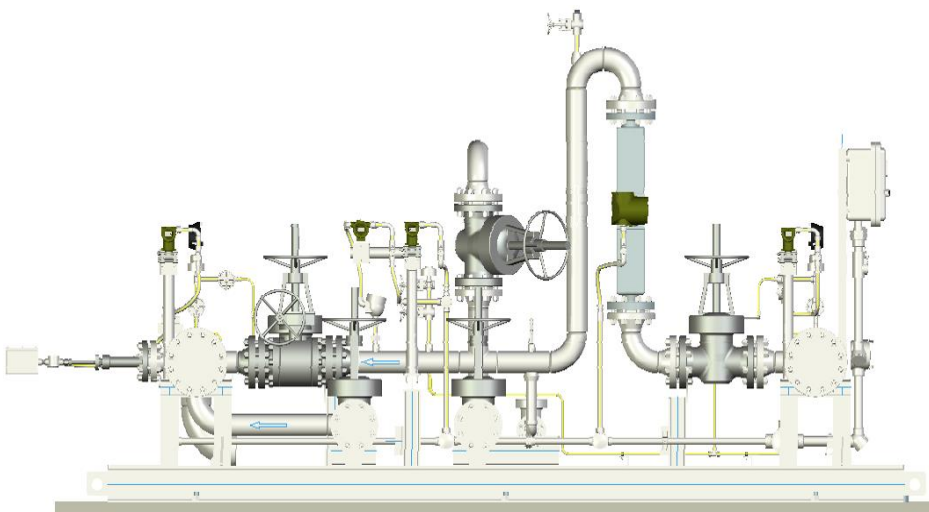


## LEASE AUTOMATIC CUSTODY TRANSFER UNITS (LACT UNITS)

The Custody Transfer concept applies when the possession of crude oil or petroleum product is transferred from one legal entity to another. LACT units are designed to perform a precise and accurate measuring of volume and quality of the petroleum products transferred between the two entities. Mainly hydrocarbons products, crude oil, gas or gasoline are measured.

Standardization parameters must be considered.

LACT units must be a reliable system for both parties.



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### 1 LACT UNIT DESIGN

LACT units are customized according to each specific service. Fabrication requires all the information related to the application in order to fully complete the design. The main requirements are the following:

- Flow type, Flow rate, Fluid Properties
- Process Temperature and Pressure
- Control & Communication

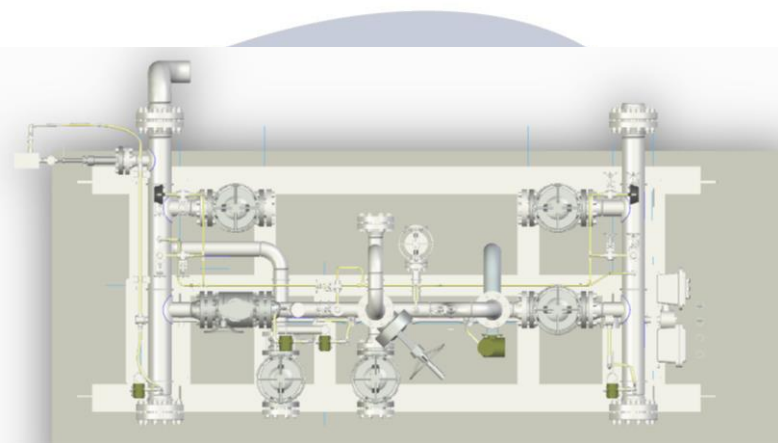
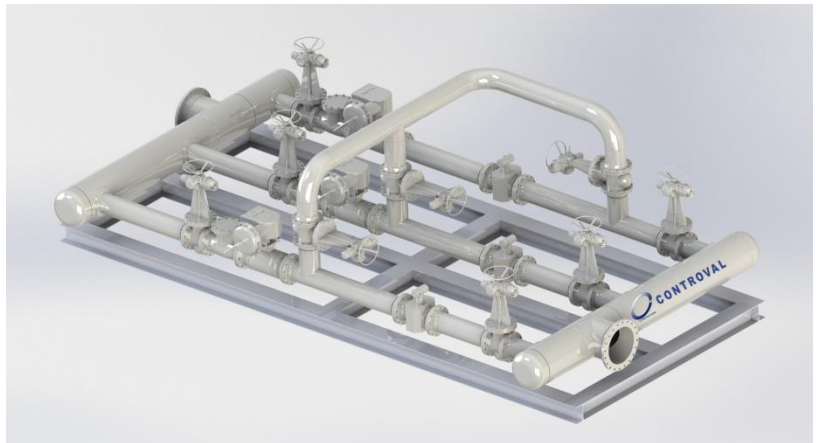


Historically, LACT units have been mostly metered by Positive Displacement or Turbine meters. Nowadays, no moving parts devices are being preferred, such as Ultrasonic or Coriolis flow meters.

## 2 LACT UNITS COMPONENTS

LACT units' main components are:

- Support Structure. To accommodate all the devices involved
- Flow meters
- Pressure and Temperature Transmitters
- Flow analyzers. For humidity, Density or Gas Composition
- Manual Valve, MOV 's or Control Valves
- Flow Computers
- Flow Conditioners
- Piping and Accessories



## 3 LACT UNITS CONSIDERATIONS

The design of a LACT unit must consider the specific application to handle. Thus, all data from end user is important to cover all the topics in order to fully understand the requirements. The only way to perform a suitable selection and arrangement of the devices involved is by gauging and tracking the following parameters:

### 3.1 Fluid

Fluid name

Fluid Flow Rate: GPD, BPD, BPH

Fluid Properties: Density, Viscosity, API

This data plays a significant role in the flow measuring method to be implemented.

### 3.2 Process Data

Pressure and Temperature ranges of the fluid.

Charge Pumps system selection: Positive Displacement or Centrifugal.

### 3.3 Communications & Controls

How will the LACT unit be controlled? Local – Remote Control – Both

How will the LACT unit operate? Batch or Continues Dispatch

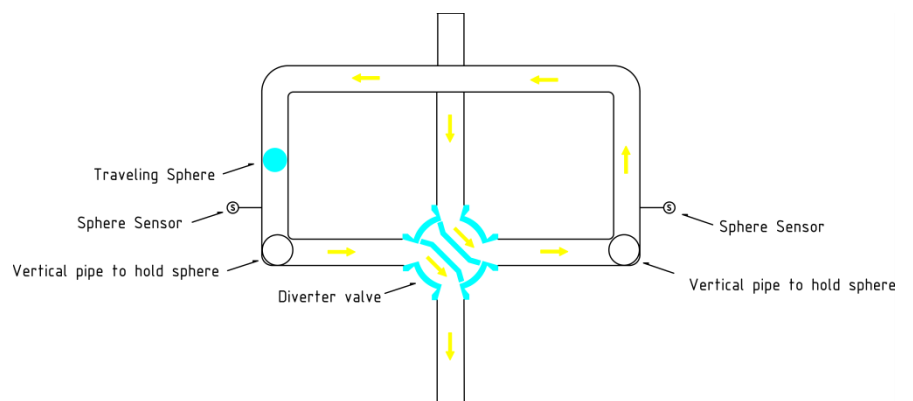
How does the end user expect to gather data from the LACT unit?

### 3.4 PROVER

In most cases a Prover is used to perform measuring validation.

LACT Unit measurements must be evaluated by means of a certified device.

There are several Prover options: Piston, Sphere or Master Meter.



## 4 LACT UNIT DESIGN

### 4.1 Devices Selection

Designer will define components selection based on fluid type and flow rate.



### 4.2 Meter Runs.

Determine the Pipe Diameters and number of Runs to handle the declared flow.

In some cases spare meter run is required to perform maintenance in multiple runs services.

### 4.3 Flow Meter Device.

Selection of the Flow Meter technology: Positive displacement meter, Differential Pressure, Turbine, Coriolis or Ultrasonic.

Each technology has specific requirements that will influence in the LACT unit characteristics.

"Meter Run" establishes the length before and after the meter device, that should be consider as part of length of the LACT Unit' leg.



### 4.4 Analytical Devices.

Selection of devices to analyze the physical properties of the fluid.

The sampler system is required to get a typical sample of the fluid, to be analyzed to obtain information such as water cut, density or gas composition.

## 4.5 Process Data

Based on Process Data, designer will define the following:

- Pipe Diameter, Material, Schedule, ANSI Rating
- Valves Rating or Flow Control Valves.
- Accessories

## 4.6 Communications Data

Based on control and data acquisition requirements, designer will define the following:

- Flow Computer
- Controller
- Wiring
- Control Panel features



## 5 HOW TO SPECIFY LACT UNITS

LACT	FLUID PHASE TO BE MEASURED										
	<b>L</b>	For Liquids									
	<b>G</b>	For Gas									
	<b>NUMBER OF LEGS</b>										
	<b>1</b>	Single Run									
	<b>2</b>	Two Runs									
	<b>3</b>	Three Runs									
	<b>4</b>	Four Runs									
	<b>2-1</b>	Second Run is for Back Up									
	<b>3-2</b>	Third Run is for Back Up									
	<b>4-3</b>	Fourth Run is for Back Up									
	<b>METER RUN DIAMETER</b>										
	<b>02</b>	2 in Pipeline									
	<b>03</b>	3 in Pipeline									
	<b>04</b>	4 in Pipeline									
	<b>06</b>	6 in Pipeline									
	<b>08</b>	8 in Pipeline									
	<b>10</b>	10 in Pipeline									
	<b>12</b>	12 in Pipeline									
	<b>HEADING MANIFOLD</b>										
	<b>00</b>	NO Manifold									
	<b>M04</b>	Manifold 4 in									
	<b>M06</b>	Manifold 6 in									
	<b>M12</b>	Manifold 12 in									
	<b>M16</b>	Manifold 16 in									
	<b>M24</b>	Manifold 24 in									
	<b>ANSI RATING</b>										
	<b>15</b>	ANSI 150									
	<b>30</b>	ANSI 300									
	<b>60</b>	ANSI 600									
	<b>FLOW METER DEVICE</b>										
	<b>PD</b>	PD meter									
	<b>DF</b>	Diff Press									
	<b>CO</b>	Coriolis									
	<b>US</b>	Ultrasonic									
	<b>PROVER CONNECTIONS REQUIRED</b>										
	<b>0</b>	NO Prover Connection									
	<b>P</b>	External Prover									
	<b>MM</b>	Master Meters as Prover									
	<b>BACK PRESSURE</b>										
	<b>0</b>	Not Required									
	<b>1</b>	Required									
	<b>DISPATCH SERVICE</b>										
	<b>B</b>	Batch Service									
	<b>C</b>	Continuous Dispatch									
	<b>ALIGNMENT VALVES CONTROL</b>										
	<b>0</b>	Manual Control									
	<b>1</b>	Electric Control									
	<b>FLUID ANALYZERS REQUIREMENTS</b>										
	<b>0</b>	No Analyzers Requirements									
	<b>OW</b>	BS%W									
	<b>SS</b>	Sampler System									
	<b>D</b>	Density Meter									
<b>LACT-</b>	<b>L</b>	<b>3-2</b>	<b>12</b>	<b>M24</b>	<b>30</b>	<b>US</b>	<b>MM</b>	<b>1</b>	<b>C</b>	<b>1</b>	<b>OW-SS-D</b>