

# SATAM

A Guidant Measurement Company

## Oil depots and terminals

### Metering Solutions



[www.satam.eu](http://www.satam.eu)

# Satam equipment

Your best metering solution  
for oil depots and terminals



# Welcome to Satam

## Specialist in liquid hydrocarbons metrology

With more than 100 years of experience in the design and manufacture of measuring systems, Satam has acquired unique expertise in liquid hydrocarbon metrology.

Specifically designed for petroleum products and non-corrosive chemicals custody transfer metering, all our measuring systems are manufactured and tested in France.

Satam equipment is used in oil depots, on aircraft refuellers, oil tanker vehicles and fuel dispensers for loading, unloading, transferring, blending and additive injection operations.

Satam also provides turnkey solutions for oil depots specifically tailored to your needs, including metering systems, flow computers, data acquisition systems, automation and monitoring systems.

## An international sales and service network

Satam has a global footprint with over 100 distributors and agents in 55 countries.

With partners periodically trained in the commissioning, use and maintenance of Satam metering systems, Satam can provide end-users with the best technical and commercial support available.

## Comprehensive expertise specific to your metering systems

- ▶ Satam is **ISO 9001** certified for the design, manufacture and sale of custody transfer flowmeters and metering systems for liquid petroleum products.
- ▶ Satam is also **EN ISO/IEC 80079-34** approved for the production of equipment, protection systems or components designed for use in explosive atmospheres as per the **2014/34/EU ATEX** Directive.
- ▶ Finally, Satam is **MID 2014/32/EU** compliant for the manufacture of custody transfer metering systems for liquids other than water as per European regulations.

## Worldwide certified metering systems

All Satam metering systems are designed for liquid hydrocarbon custody transfer and fiscal metering. They have metrology approvals under international recommendations **OIML R117** and European regulation **MID 2014/32/EU** (Measuring Instruments Directive).

Many national Weight and Measures approvals are also available to meet country-specific requirements.

**SATAM**  
A Guidant Measurement Company



# Satam Solutions

## Oil depots and terminals

With over 60 years of experience in the manufacture of Positive Displacement meters (PD meters) and measuring systems, Satam has developed a comprehensive product range for oil depots and terminals.

To guarantee the perfect control of quantities of hydrocarbons entering and leaving your facility, Satam provides metering solutions optimally tailored to each type of application.

The accuracy, safety and long service-life of Satam equipment allows us to provide you with optimal metering station performance and maximum profitability in the distribution of your petroleum products.

Furthermore, the Satam Service team, which is fully trained in all aspects of oil industry requirements, guarantees optimum availability of your metering equipment and installations.

- **Products reception and transfers**
- **Truck and rail car loading stations**
- **Supervision and management of loading bays and product movements**
- **Service activity**



**Products reception**



**Truck loading stations**



**Rail car loading stations**



**Service activity**



**Supervision and management**

# Products reception

The “Reception metering systems” product line is designed to quantify the delivery of petroleum products to oil depots and service stations. This supply can be by tanker truck, rail car or pipeline.

## ➤ Gravity feed reception unit

This measuring unit is specific for the gravity emptying of a tank to underground storage. It is fitted with an automatic gas elimination system linked to the dosing valve. This provides total reliability of the volume measurement even at the start and end of unloading with a partially empty hose configuration. The entire transferred product can be measured with enhanced accuracy.

This measuring unit can be supplied with an electronic or mechanical register. The mechanical version is totally self-powered.



Gravity feed reception unit ZCE11-80

## ➤ Gravity feed reception unit with pump



Reception unit with pump ZCE21

This reception unit is fitted with a centrifugal pump. It is designed to empty tanks to underground or surface storage. Its built-in gas elimination device guarantees reliable volume measurements in all the unloading steps.

This measuring system is supplied fully assembled, factory tested and mounted on a support frame. It allows for immediate use without requiring electrical cabling and complex hydraulic connections. It is a compact design construction and can be easily installed in small spaces.

## ➤ Reception unit for pressurized liquids

These reception units are designed for pumped liquid metering. They are generally fitted with an air eliminator and strainer. This makes it possible for the complete delivery measurement to be reliable and accurate even in the case of liquid - gas mixtures into the upstream delivery hose. ZCE6 is also available in a high flow rate version for the measurement of refined petroleum products transported by pipeline.



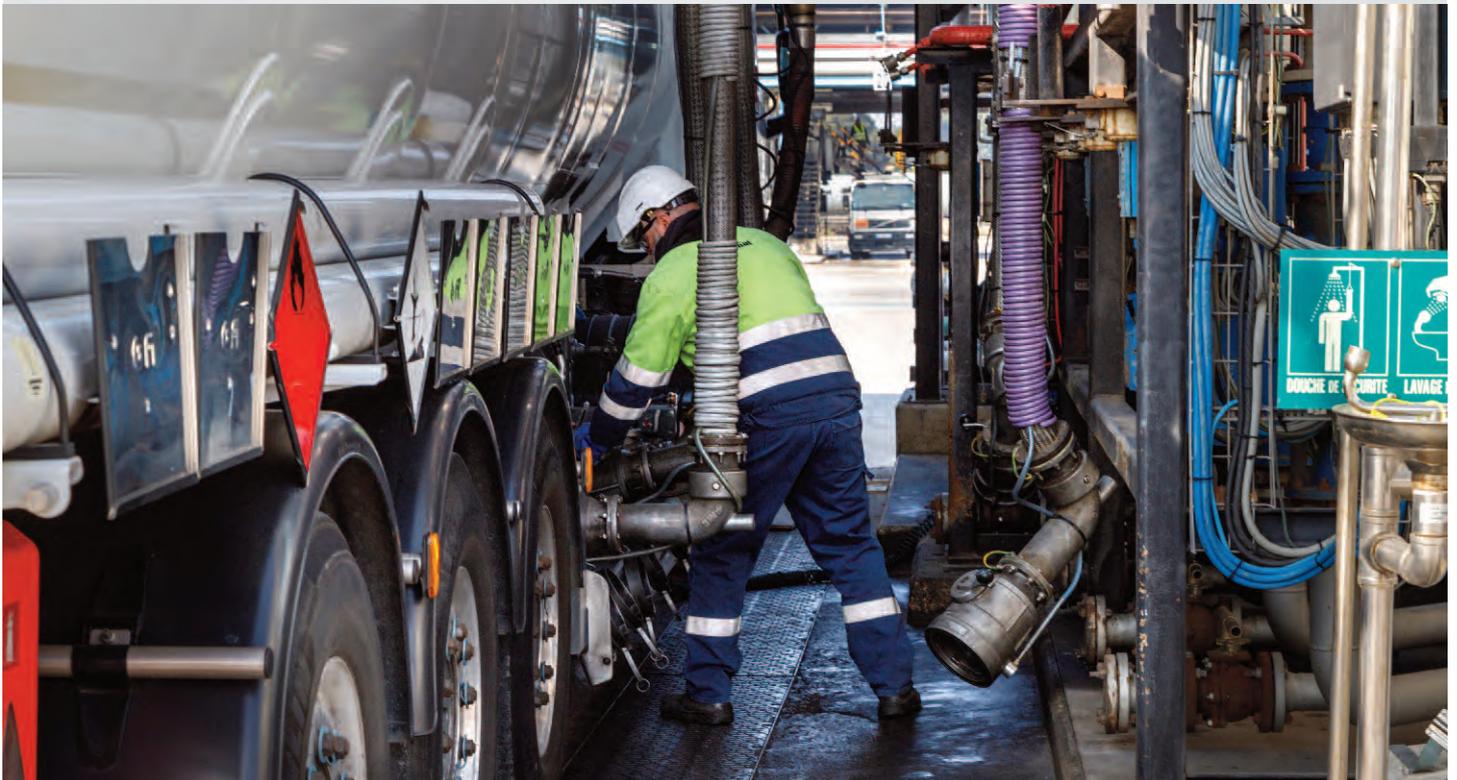
Reception unit ZCE5-H

# Loading bays

## ➤ Metering systems for tank truck and rail car loading

Satam vertical or horizontal metering units are designed for tank truck and rail car loading stations in a top or bottom loading configuration. Although they are factory fitted with strainer, air eliminator and multifunction valve, their compact design allows for easy installation in smaller facilities and on compact pipeline networks.

They are supplied with a mechanical register or with an electronic register - batch controller. In order to take liquid variations (temperature, product composition) into account, the electronic metering units can be fitted with a temperature probe for a transaction in corrected volume, or with a density metering package for a transaction in mass.



Vertical metering system ZCE5-V



Horizontal metering system ZCE5-H

# Loading bays

## ➤ Fuels additives injection

The injection of up to 12 additives per loading arm can be electronically controlled by the Equalis controller. In order to prevent any contamination between 2 successive batches, the “Clean Arm” function is built-in as standard into the batch controller software. This makes it possible to complete loading without any additive in the liquid between the injection point and the truck coupling.

Satam has developed a MID/EC – OIMLR117 approved additive injection metering system to meet local Customs and Excise requirements. The additive package includes a micro-PD meter, electro valve and Equalis S additive controller.

The injection of 1 or 2 additives can also be mechanically controlled by 2 injection piston pumps directly linked to the PD meter rotor.



**Additive injection module ZCE28 with OIMLR117 approved meter**



**Mechanical additive injection module XAD41**



**Additive injection modules with electronic controller**

## ➤ Fuels blending

Satam has developed a fuels blending system allowing full control of blended product quality and custody transfer measurements. The Equalis flow computer can manage downstream blending with 2 meters measuring the blending components, or upstream blending with one meter on one component of the blending and the second meter on the blended product. In both cases the flow computer controls the flow rate of one component using a digital control valve in order to achieve a perfectly managed blending rate. As for additive injection, a “Clean Arm” function is also built-in as standard in order to prevent any contamination between 2 successive batches.



**Blending system ZCE25**

# Components of a metering system

## ➤ Positive Displacement meter: robust, proven technology



### An outstanding measurement stability

Satam has developed a comprehensive range of PD meters specific to petroleum products metering. Backed by its technical know-how, Satam is able to deliver a high accuracy PD meter that remains stable year after year with almost no need for regular adjustments.

### Significant maintenance costs savings

Satam PD meters have a very simple design using only two pairs of blades and one moving rotor. This guarantees an exceptionally robust device, allows local maintenance and repair, thereby generating significant maintenance cost savings.

## Characteristics of Satam PD meters

Model	Size	Flowrate		Accuracy	Repeatability
ZC17-12	2"	20 - 200 L/mn	1.2 - 12 m3/h	0,15%	0,02%
ZC17-24	2"	40 - 400 L/mn	2.4 - 24 m3/h	0,15%	0,02%
ZC17-48	2"	80 - 800 L/mn	4.8 - 48 m3/h	0,15%	0,02%
ZC17-80	3"	133 - 1333 L/mn	8 - 80 m3/h	0,15%	0,02%
ZC17-150	4"	250 - 2500 L/mn	15 - 150 m3/h	0,15%	0,02%
ZC17-250	6"	416 - 4166 L/mn	25 - 250 m3/h	0,15%	0,02%
ZC17-330	8"	550 - 5500 L/mn	33 - 330 m3/h	0,15%	0,02%

## ➤ Density metering package

The Satam density metering package provides real time fuel density measurement. Combined with the Equalis flow computer, it allows the continuous monitoring of measured product mass and base volume.

Thanks to the taking into account of density variations, mass and corrected volume accuracy is significantly improved.

Depending on the requested configuration, the density package can be located at the inlet of the PD meter or the main supply pipe in order to have only one densitometer for several meters.



## ➤ Multi-function valves and digital control valves

Specially designed for petroleum products, Satam valves are recognized for their robustness, durability and serviceability. They are available in "2 positions version" for simple control of fuel loading. The digital valves are flow control valves designed for blending applications or for flow adjustment in changing pressure conditions.



# Components of a metering system

## ▶ Batch controller: powerful and versatile



Compact version



Remote version

The Satam Equalis batch controller is a powerful and versatile field flow computer designed for management of loading and offloading operations and optimum communication with the supervision system. It meets all the safety and accuracy requirements for installation in oil depots. Custody transfer certified, it is compatible with the entire range of volumetric meters used in this industrial sector.

### Key points

- Management of loading valve
- Management of additives injection and fuels blending
- Management of safety systems
- Direct connection to one or two meters
- Direct connection with a densitomer
- Display of loaded fuel operating and average density
- Loaded quantities in volume, base volume or mass
- Secured logging of metrological data
- Local view of stored transactions

## ▶ Large display unit

DIR 12 is a large display unit for volume or mass display. Specific for installation on loading bays, it provides real time display of loaded quantities in volume or mass. Its high brightness LED design provides optimum legibility at distance and in low-light conditions.



## ▶ Gas elimination device

Satam has a comprehensive range of gas elimination devices to ensure reliable and accurate measurements whatever the upstream hydraulic conditions are. They are generally fitted with a strainer. They are custody transfer approved according to OIML R117 international recommendation.



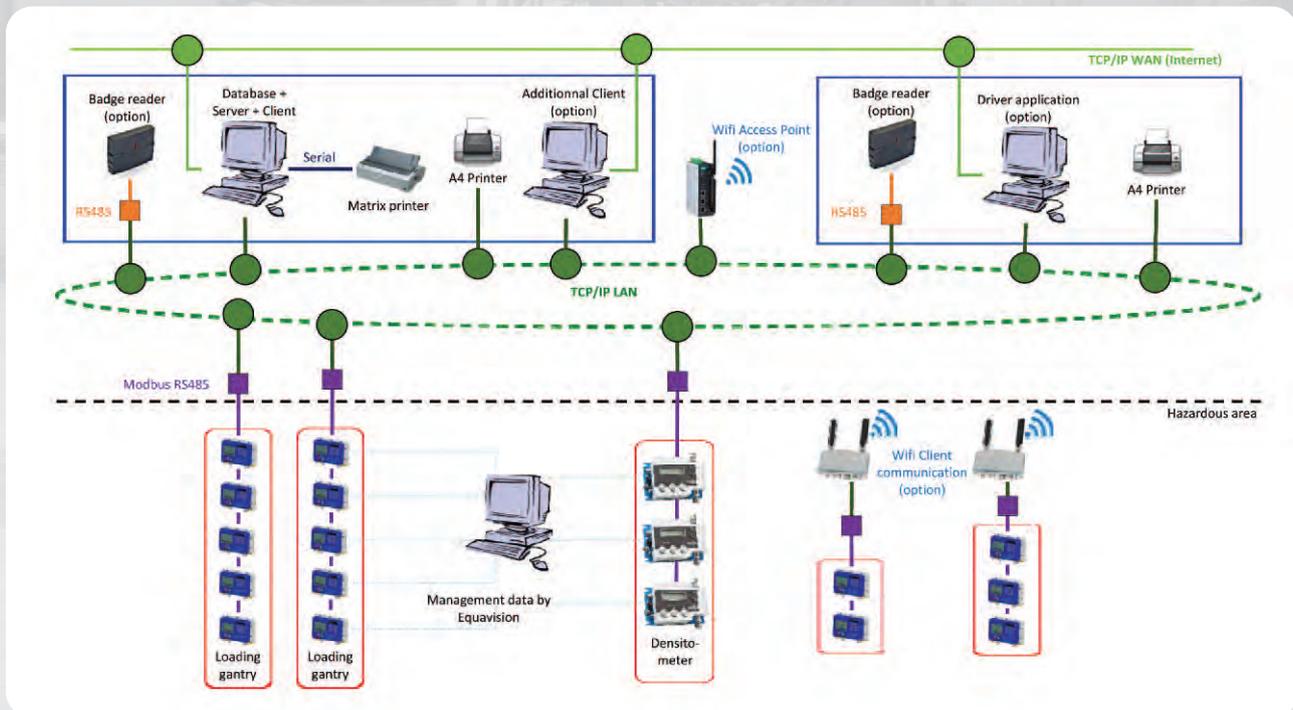
# Supervision and management system

Equavision is loading and reception stations monitoring software based on client-server architecture. It provides a fully modular structure adapted to all sizes of installations. Equavision allows you to centralise and archive all your metering data and to remotely control your loading stations via full loading plan management.

Equavision collects the data from the Equalis calculators and performs the databases administration. It is also a maintenance and configuration tool. It stores all the Equalis calculator internal operating data and provides full, fast and effective troubleshooting.

## Equavision functions

- **User administration using specific authorisations**  
Clients, quotas, vehicle specifications, drivers
- **Delivered products management**  
Product type, additive type and content, blending rate
- **Loading operation control and management**  
Pre-selection, loading plans, badge reader identification, delivery reports
- **Products reception control and management**  
Unloading from tanker trucks and rail cars, tank to tank transfers, pipeline deliveries
- **Transaction and event recording**  
Transaction logs, calculator operational status reports



Architecture of Equavision system

# The Service activity

To maintain your equipment and metering installations at their highest performance levels, Satam proposes a complete line of service solutions. Its team of customer service technicians has excellent knowledge of your industrial processes and safety requirements. It is completed by an international network of agents trained in the use, configuration and maintenance of our equipment.

## ➤ Commissioning your installation

Our customer service team checks the compliance of your new installations and performs the commissioning of your equipment as well as training specific to your applications for your operations and maintenance staff.



## ➤ Metrology expertise



Satam has unique experience in the legal metrology and custody transfer applications sectors. Its specialised project team will audit your installations and propose upgrade solutions to keep them compliant with applicable national and international regulatory requirements.

The Satam service team has all the accreditations and traceable standards to carry out metrology calibration and checks on equipment.

### Master meter for periodic on-site calibration

Fuel meters require periodic on-site calibration in compliance with applicable standards. Satam proposes master meters that can be used as working standards. They can be used regularly to check and adjust meters or metering units. Their reduced size makes it easy to transport them to different sites without requiring any lifting equipment.

## ➤ The maintenance activity

Satam provides the continuity of your metering installations via a complete maintenance offer. We carry out a complete diagnosis of your equipment and offer preventive maintenance solutions to reduce the likelihood of the failure or damage to equipment to a minimum. The Satam team is trained for rapid and effective intervention, to prevent any interruption to your metering.



## World wide Location Chart

### Headquarters and Sales Department

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As Satam regularly improves its products to ever better respond to evolving market and regulatory requirements, it reserves the right to change any of the specifications of these products, and this without prior notice.

