

SATAM

A Guidant Measurement Company

Aviation

Metering Solutions



www.satam.eu

Satam Equipment

Your best available solution for aviation fuel metering



Welcome to Satam

Hydrocarbons metrology specialist

We are experts in hydrocarbon metering solutions. We develop, manufacture, market, maintain and renovate metering systems for the hydrocarbon supply chain. Specifically designed for custody transfer metering of liquid petroleum products and non corrosive chemicals, all our metering systems are made in France.

They are used in oil depots, on aircraft refuellers, oil road tankers and fuel dispensers for loading, unloading, transfer, blending and additive injection operations. Satam also provides turnkey solutions for oil depots including metering systems, flow computers, data acquisition systems, automation and supervisory systems

An international sales network

Satam has a wide distribution network with 100 agents in 55 countries. Our agents are trained in the use and maintenance of Satam metering systems. They provide the end user with the best technical support available.



Worldwide certified metering systems

Satam equipment is designed for custody transfer and fiscal metering of liquid hydrocarbons. Metering systems have pattern approvals subject to European regulations (Measuring Instruments Directive) and international recommendations (OIML R117-1).



Many national approvals are also available to satisfy country specific requirements. ISO 9001 and ATEX certifications, electrical and chemical work authorisations and on site verification approvals ensure our expertise is genuinely comprehensive.



➤ EN ISO/IEC 80079-34 : 2011 for the production of equipment, protective systems or components intended to be used in explosive atmospheres according to 2014/34/EU ATEX Directive.



➤ MID 2014/32/EU compliance certificates for the manufacturing of custody transfer metering systems for liquids other than water according to European regulations.



Meter calibration

Each meter and metering system leaving the factory is subjected to wet calibration by direct volume comparison for full compliance with international standards. Each Satam calibration rig is traceable to national standards.



SATAM

A Guidant Measurement Company



Positive displacement meter



Gas extractor device

Characteristics of Satam PD meters

Model	Size	Flow rate	Accuracy	Repeatability
ZC17-12	2"	20 - 200 L/mn	0,15%	0,02%
ZC17-24	2"	40 - 400 L/mn	0,15%	0,02%
ZC17-48	2"	80 - 800 L/mn	0,15%	0,02%
ZC17-80	3"	133 - 1333 L/mn	0,15%	0,02%
ZC17-150	4"	250 - 2500 L/mn	0,15%	0,02%
ZC17-200	6"	416 - 4166 L/mn	0,15%	0,02%
ZC17-330	8"	550 - 5500 L/mn	0,15%	0,02%

Satam Solutions

Aircraft refuellers and hydrant dispensers

➤ Positive displacement meter : a robust and proven technology

With more than 60 years of experience in manufacturing Positive Displacement meters (PD meters), Satam has developed a comprehensive product range dedicated to jet fuel measurements with specific materials and connections.

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 periodic adjustment.

Its simple design using only two pairs of blades and one moving rotor guarantees an exceptionally robust device and generates significant savings on maintenance costs.

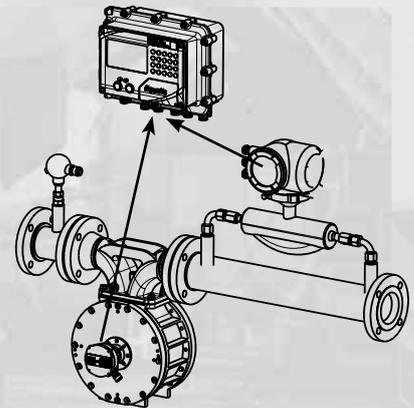
All the Satam PD meters are custody transfer approved according to European regulation MID 2014/32/EU and to international standard OIML R 117-1.



➤ Automatic density measurement loop for an optimised density measurement

In order to replace traditional manual density measurement, Satam has developed a real-time fuel density measuring system for the automatic monitoring and registration of jet-fuel density.

Temperature and density measurements are continuously processed by the Equalis batch controller during the fuelling operation. At the end of the loading, Equalis calculates the average density and the loaded quantity in volume and in mass.



➤ Gas extractor device

XAD20150 is a gas extractor device dedicated to aircraft refuelling measuring systems. It can be mounted on horizontal or vertical micro filter gas separator.

It is custody transfer approved up to 150 m³/h according to European regulation MID 2014/32/EU and to international standard OIML R 117-1.



Equalis S Aviation

Aircraft refuellers and hydrant dispensers

➤ Batch controller: powerful and versatile

The Satam Equalis S batch controller is a powerful and versatile field batch controller designed for aircraft refuelling vehicles and road tanker loading stations. It meets all the requirements in terms of security and accuracy for installation on fuel transport vehicles or hydrant dispensers.

Equalis S is custody transfer certified and compatible with the entire range of volumetric meters used in this industrial sector. It can directly interface with most cab mounted data capture systems.

➤ Key points

- Compliance to standards JIG 105, JIG110, and JIG 130
- Compact or remote design for easy installation
- Ability to manage fuelling and defuelling operations
- Can be connected to one or two meters
- Direct connection with automatic density meter
- Calculation and display of average density of loaded fuel
- Loaded quantities in volume, corrected volume and mass
- On screen browsing of stored transactions

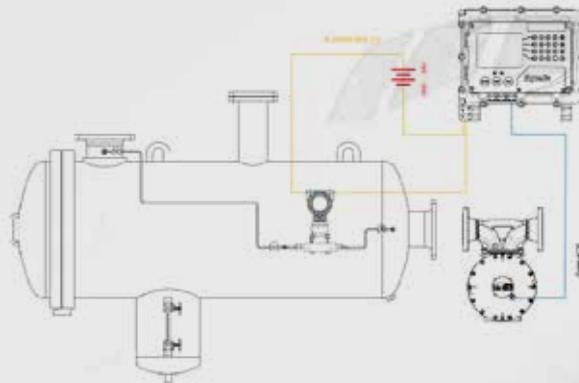


New functions

of Equalis S Aviation

➤ Corrected Differential Pressure : JIG 105/130

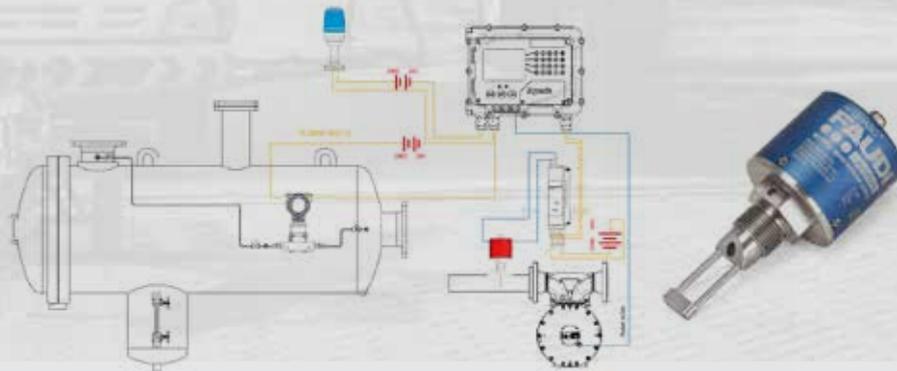
- Correction of the differential pressure (according to JIG 105/130) to measure filter clogging.
- Systematic storage on USB key (last 500 deliveries) and alarm management (JIG 130/105)
- Possibility to stop the use of truck if a risk is detected regarding the quality of the fuel delivered
- Unlocking by badge Head of Maintenance Operations procedure (JIG recommendation: ban on deliveries)
- Management of the filter change date and locking if exceeded



(1) : in the case of an intrinsically safe differential pressure sensor, it is necessary to use an isolation barrier (BETI Georjin series type for example)

➤ Water detection in fuel in real time : JIG 110

- Certain types of old filters require a water presence sensor.
- Recording of all sensor values on USB key (compulsory according to JIG). Also available on the MODBUS table and large display: real-time alert, delivery/truck locking and badge procedure responsible for maintenance operations



(1) : in the case of an intrinsically safe differential pressure sensor, it is necessary to use an isolation barrier (BETI Georjin series type for example)

➤ Interlocks function

- **Safety/process sensors (example: pipe not stored, preventing the truck from starting : park brake, complete list, deadman)**
- Characterize a mission : measure the time of a mission (parking departure, taxiing, parking under the aircraft, start of fueling, end of fueling, taxiing and return to parking)
 - Interlock n°1 : Parking brake
 - Interlock n°2 : Tone wheel (entry positioned if speed >5km/h)
 - Interlock n°3 : Pump or power take-off
- Securing deliveries on twin-reel trucks
 - Interlock n°4 : Positioning of the left (or short) coupler
 - Interlock n°5 : Positioning of the straight (or long) coupler

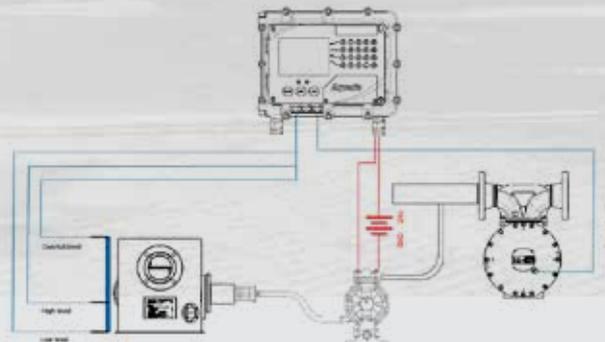
➤ Geolocation of interlocks: locate each event on the truck



Each event can be located in real-time wherever it happens on airport ground

➤ Reinjection tank (hydrant/wing pressure damper)

- The product is pushed into the reinjection tank by the difference between pressure in hydrant 8 bar and pressure in wing 3.5 bar
- The Equalis recovers 3 sensor levels and manages the reinjection of the product into the front wing and during delivery depending on hazards.
- The Equalis can cut off the distribution valve and open the reinjection valve.

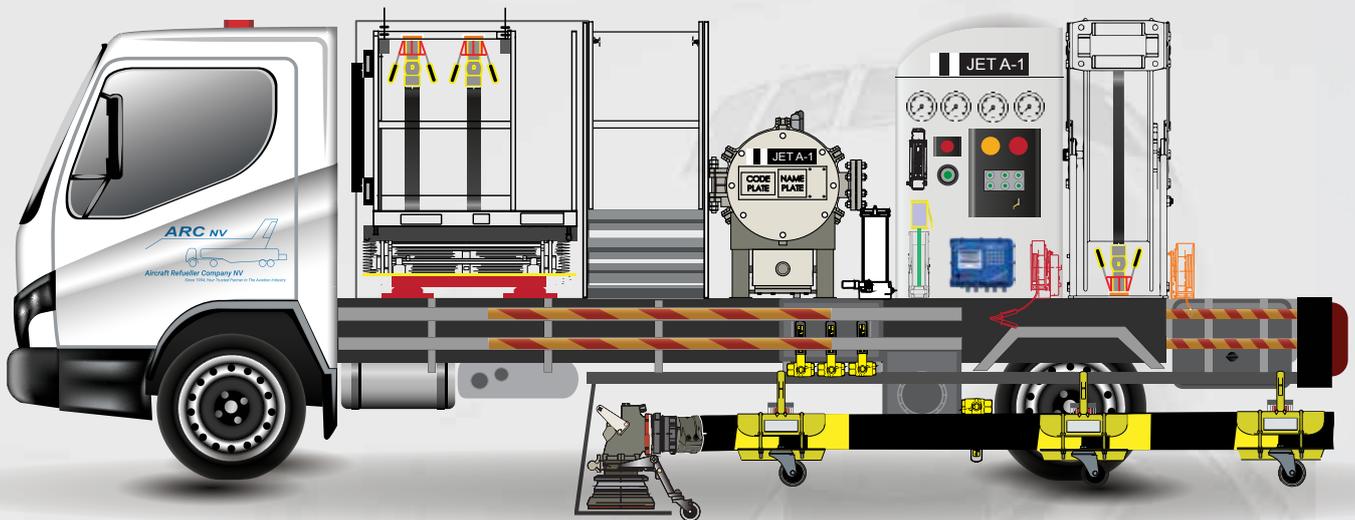


➤ Product recovery (defueling)

- Identification of the counting direction for product recovery

➤ Truck functions

- Manage clutch / bottom valve (release the product as the bottom of tank) / Pump



Drawing Credit Ahmed M.Hatem

➤ SAF compatibility

- Satam counting systems allow the delivery of SAF to aircraft when loading Jet-Fuel.

Equalis S Aviation



All your major interlocks (delta P, geolocation, deadman, ...) in one loading PLC with possibilities to communicate with any fuelling management system.

In addition with our new multicolor Large Display we will be able to inform and alert the operator during the whole refueling phase of current volume, density and any specific message that our clients want to be seen by the operator or the pilot.

This will be done with explicit scrolling messages (orange for warning, red for alarm, green for normal progress, blue for volume or mass) and in several languages.



> Large display

Large display is a unit for indication of volume or mass. It is designed for installation on aircraft refuellers, hydrant dispensers and road tanker loading stations.

Large display can be connected directly to the flow computer via data bus or via frequency input. It operates as a flow computer displayed volume repeater. With its configurable pulses input, DIR 12 can also directly display the volume or mass measured by a flow-meter.



> Key points

- Total quantity displayed in real time with six digit technology
- Direct connection to a batch controller without need for any configuration software
- Flame proof housing for a maximum robustness
- 1 panel of 8x48.
- Multicolor interface to alert the operator during the refueling phase with a message
- Explicit scrolling (orange for warning, red for alarm, green for normal progress, blue for volume or mass) in several languages.
- Possibility of control by a third-party terminal.

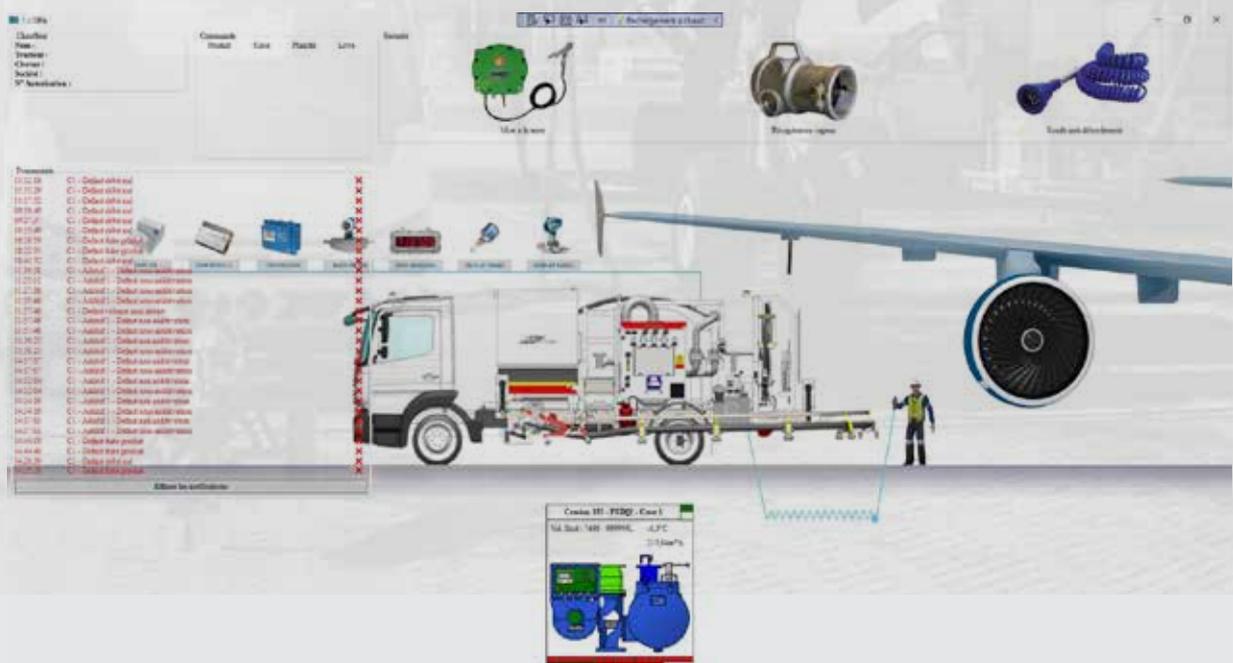


Equaviation

To help truck operators to better understand truck work : Weekly reports for each truck (JIG) Wifi/TCP

➤ Equaviation functions

- Transfer to the sensors the maximum amount of information collected and processed by the Equals.
- Provide this information via the Modbus protocol via an interface:
 - Wired (TCP/IP RJ45) for return to the on-board tablet
 - Wifi for feedback at the end of the mission when the truck returns or in real time on the on-board tablet
 - Permanently archive volatile information and consult it later
- Create weekly, monthly reports by truck



Satam Solutions

Airport fuel farm

➤ Measuring unit for refueller loading stations

Satam vertical or horizontal metering units are designed for refueller loading stations in a top or bottom loading configuration. Their space saving configuration enables easy installation in smaller facilities and in compact pipeline networks. All Satam measuring units are approved for commercial transactions according to European regulation MID 32/2014/EU and to international standard R 117-1.



Horizontal metering system ZCE5



Vertical metering system ZCE6

➤ Additive injection in aviation fuels

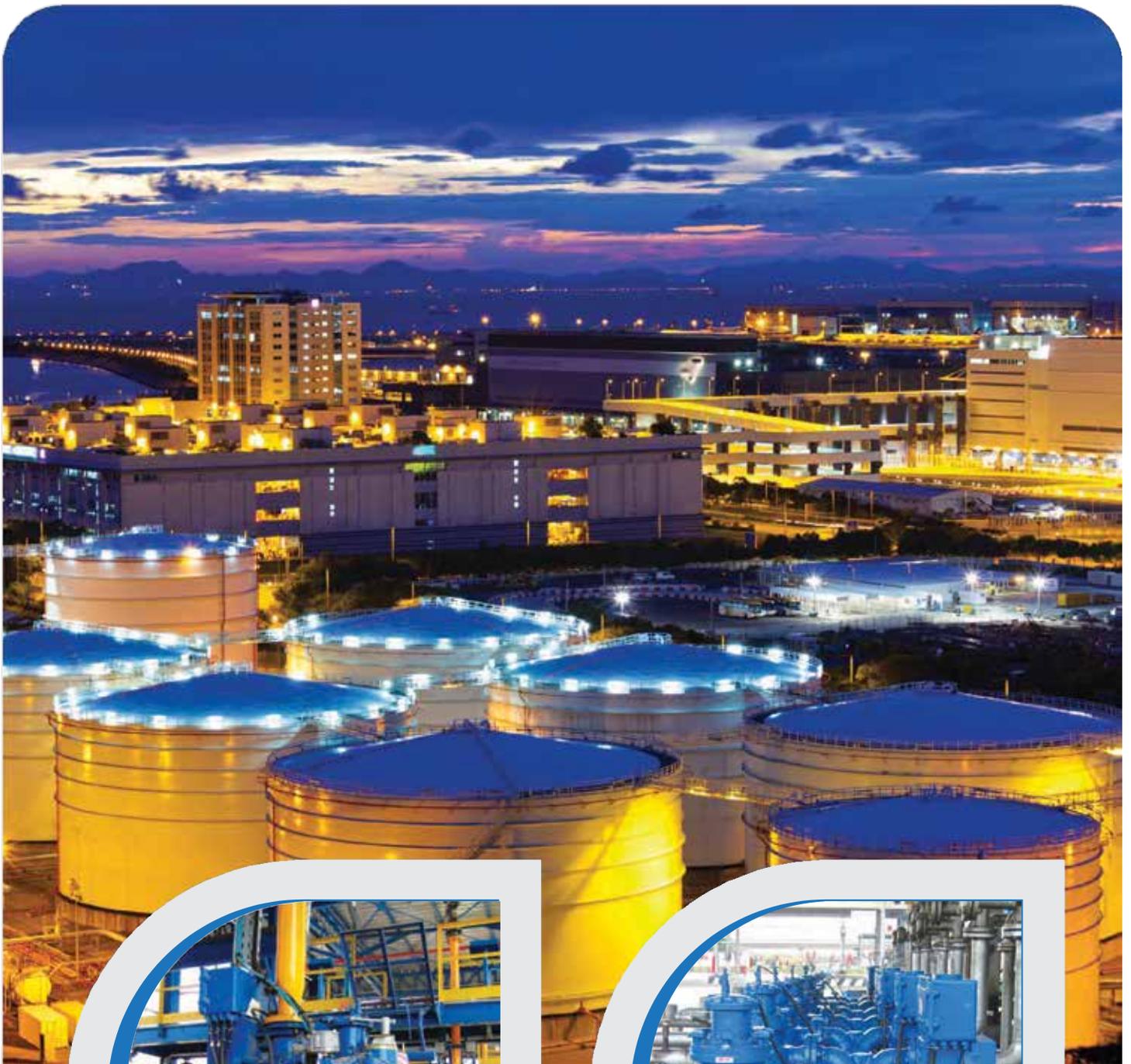
Satam offers comprehensive solutions for aviation fuel additive injection such as anti icing, corrosion inhibitor, antistatic and thermal stabiliser additives. Injection of the additives can be electronically controlled by the Equalis batch controller. It can also be mechanically controlled by an injection piston pump directly linked to the PD meter rotor.



Mechanically controlled additive injection



Additive injection modules controlled by flow computer



Measuring systems for petroleum product balances on the fuel farm

A wide range of Satam measuring systems is dedicated to pipeline and product reception applications. The inflow and the outflow into the airport fuel farm can be measured with a high level of accuracy.

This allows the depot operator to draw up a reliable balance of its product movements.

Tailor-made projects

➤ Project management

On-site visit and prevention plan signature
Management of subcontractors
End of business folder

➤ Design

Audit of customer facilities
Creation of tailor-made counting installations
Skids Plug&Play

➤ Software development

Upgrade of existing software on site
Integration of new counting/security functions
Creation of new mixtures/recipes

➤ Equipment supply

Manufacturing of Satam systems
Procurement of subcontracted systems
Supply of equipment purchased from suppliers

➤ MID commissioning service for measuring systems

On-site verification of piping conditions

Parameters setting

- Primary verification
- Initial verification of measuring sets (gauge not provided)
- Supply of metrological notebooks

➤ Piping conditions management

Creation of the new piping conditions based on the pipe fitter drawings and isometrics provided by the customer.
Administrative validation of piping conditions provided by the customer.



Satam Solutions

Refuelling of small airplanes and helicopters

➤ Satam aircraft refuelling cabinets

This complete aviation fuel distribution unit is dedicated to the fuelling of small airplanes and helicopters. It is delivered ready for use. It includes a custody transfer approved metering system with mechanical or electronic register, a micro-filter separator, a pump and a fuel distribution hose and nozzle. The version fitted with electronic register provides a secured back up of each transaction and a direct data transmission to the customer's administration and management information system.



Meter calibration

➤ Master meter for periodic meter field calibration

According to international aviation standards, meters operating on aviation fuels need to be periodically field calibrated. Satam offers a master meter operating as a working standard. It can be used regularly to check and calibrate measuring instruments or measuring systems. With minimal dimensions, it can easily be moved to several different sites without the requirement for lifting tools.



Master Meter

Tailor Made



Satam master meters model ZCM17 are dedicated to periodic calibration of custody transfer measuring equipment for fuels and petroleum products.

ZCM 17 is a working standard that can be used regularly to check and calibrate measuring instruments or measuring systems.

We can propose a wide range of standalone master meters or complete master meter trolleys.

SATAM engineering team has developed an extended line of trolleys to adapt calibration of refuellers or Jet metering units. As an engineering company we will be very happy to propose as well tailor-made units.



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World wide Location Chart



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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.

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