

Factors Contributing to Revenue Loss in the Fuel Industry

Petrol stations owners experience revenue loss through various means, including fuel theft, discrepancies in fuel accounting, decreased sales due to rising prices, and operational inefficiencies.

Additionally, factors like high operating costs, competition, government regulation and economic downtime can contribute to loss in revenues.

Fuel Theft and Discrepancies:

- **Fuel theft:**

Theft can occur through various methods, including tampering with dispensing pumps, siphoning fuel, or fraudulent transactions.

- **Accounting errors:**

Inaccurate tracking of fuel deliveries, sales, and inventory can lead to discrepancies, making it difficult to identify actual losses.

- **Calibration issues:**

Faulty pumps that don't dispense the correct amount of fuel can also result in revenue loss.

How to Mitigate Revenue Loss

- ✓ To mitigate revenue loss, petrol stations should focus on preventing fuel theft, improving operational efficiency, and enhancing customer experience.
- ✓ This can be achieved through implementing robust fuel management systems, optimizing pricing and stock levels, and providing excellent customer service.
- ✓ Real-time fuel monitoring systems can detect and prevent fuel pilferage and fraud, ensuring accurate measurements and reducing losses due to theft or inaccurate dispensing.
- ✓ Data-driven insights from fuel management systems can help optimize pricing strategies and manage fuel stock effectively, minimizing losses from understocking or inaccurate forecasting.

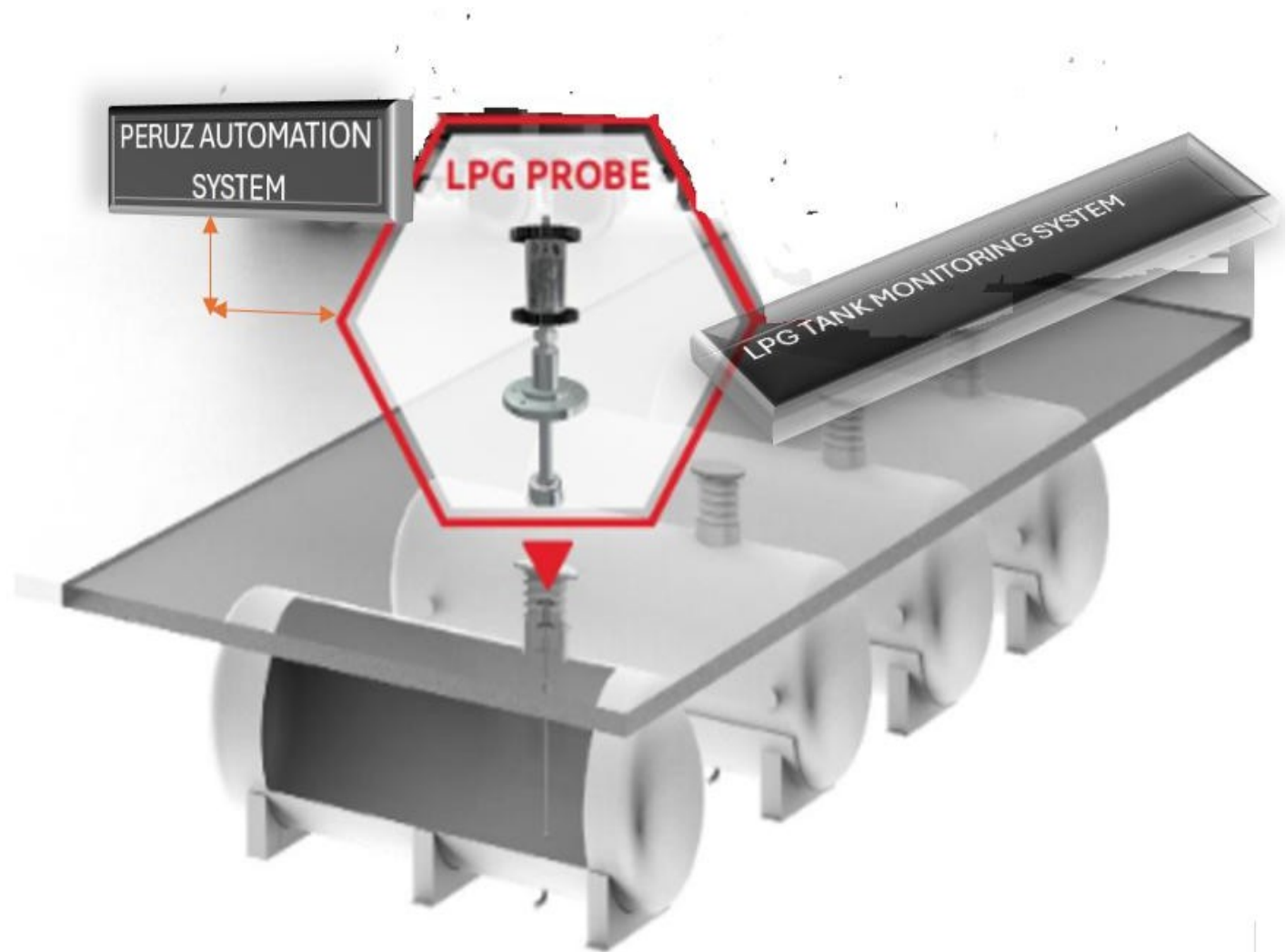
System Main Components

- **Automatic Tank Gauging System**- Involves installation of High Accurate Level Sensors inside the Fuel Tank or LPG Tanks.
- **Pump Automation** - Involves installation of Forecourt Controller for Control and Monitoring of Fuelling Processes, Fuel Price Management, Automatic capturing and Storage of Fuel Transactions Data.
- **Pump Attendant Management**- Involves installation of RFID Card Readers on each side of the pump. Each pump Attendant is issued with programmable RFID card for identification and Authorization during fueling.
- **Continuous Tank Autocalibration**- Our fuel management is able to perform automatic tank calibration by reconciling the displacement of fuel levels versus the liters dispensed.
- **Centralized Web Remote Access**- Allows access to the automated fuel stations and Depots using any web browser at any given time or location.

LPG BULK STORAGE MONITORING SYSTEM

Involves installation of either;

1. Invasive Fuel Level Sensors.
2. Non- Invasive Fuel Level Sensors



INVASIVE- LPG TANK AUTOMATION SYSTEM

- The system involves installation of an electronic fuel level sensor on the LPG Bulk storage tank.
- The fuel level sensor is connected to a tank gauging controller mounted inside the CR at the depot
- The installation kit includes stainless-steel jacket tube for probe shaft and float kits suitable for pressure inside the LPG tank.
- The protective tube design makes maintenance easily, Just pull out the probe and keep the protective tube.
- Accuracy +/- 1mm

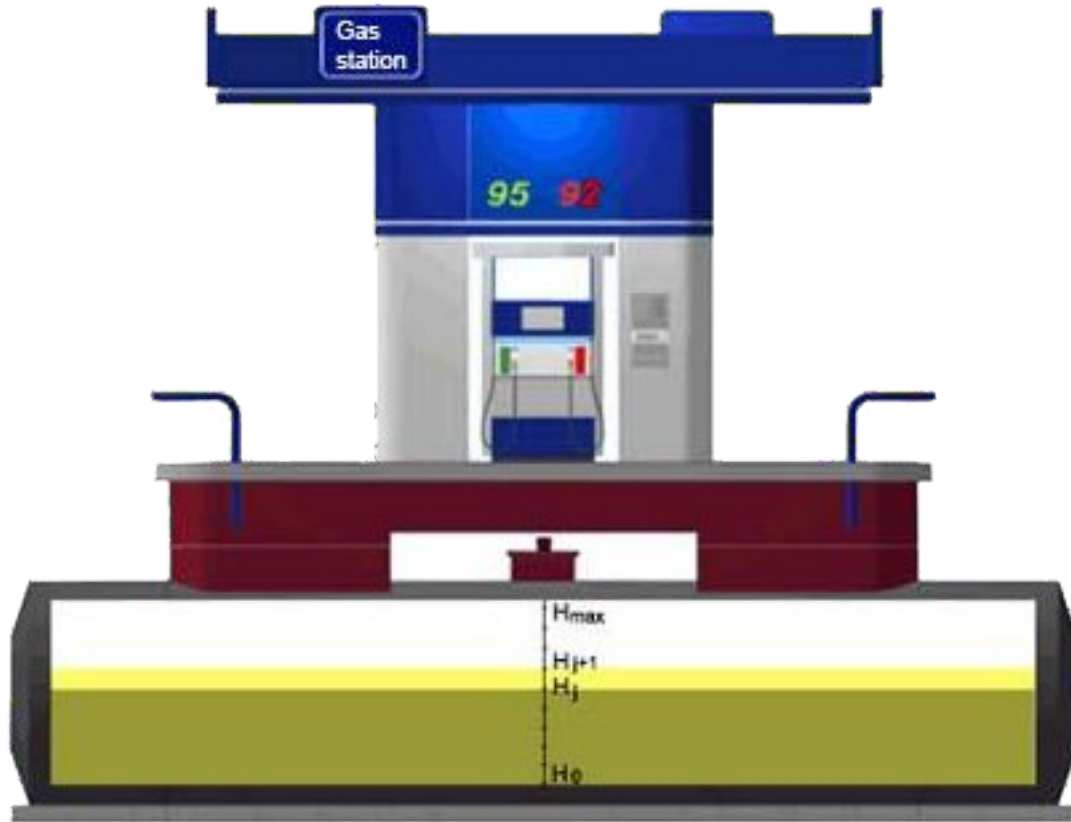


NON- INVASIVE LPG TANK MONITORING SYSTEM

- Involves installation of two Ultrasonic sensors for continuous measurements of LPG.
- The Ultrasonic sensors are connected to a tank gauging controller mounted inside the CR at the depot
- The sensors are installed from the outer lower and center outer sides of the LPG tank.
- The sensors emit ultrasonic waves into the LPG tank and receive the reflected signal, which is sent to the controller.
- Sensor 1 measures the distance to the separation of media (liquid and gaseous).
- Sensor 2 is used for measuring the medium properties (sound velocity) and is intended to correct the readings of the Sensor 1 to increase the accuracy of measurements.
- No Tank decommission or drilling is required.
- Accuracy +/- 1mm.



AUTOMATIC TANK CALIBRATION



By leveraging data from both the Pumps and the Tanks our fuel management system continuously generates accurate calibration tables to ensure accurate fuel stocks and sales reconciliation report.

Automatic Tank Calibration

PERFORMED BY PERUZ AUTOMATION SYSTEM

Collects fuel dispenser and ATG probe data

Matches dispensed volumes to tank level changes

Adjusts calibration tables over time

This eliminates traditional calibration method which requires decommissioning of tanks which leads to disruption of operations, costly exercise and time consuming

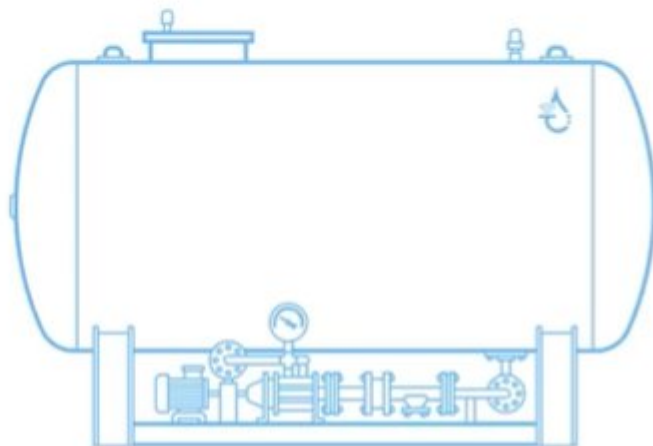




Height, mm	Volume, L
0	0
115	2000
230	4000
345	6000
459	8000
574	10000
688	12000
803	14000
918	16000
1 032	18000
1 147	20000

**FUEL VOLUME IN TANK IS CALCULATED
USING THE CALIBRATION CHART**

**TANK CALIBRATION CHART SHOWS HOW THE FUEL VOLUME CHANGES
WITH ITS HEIGHT IN THE TANK**



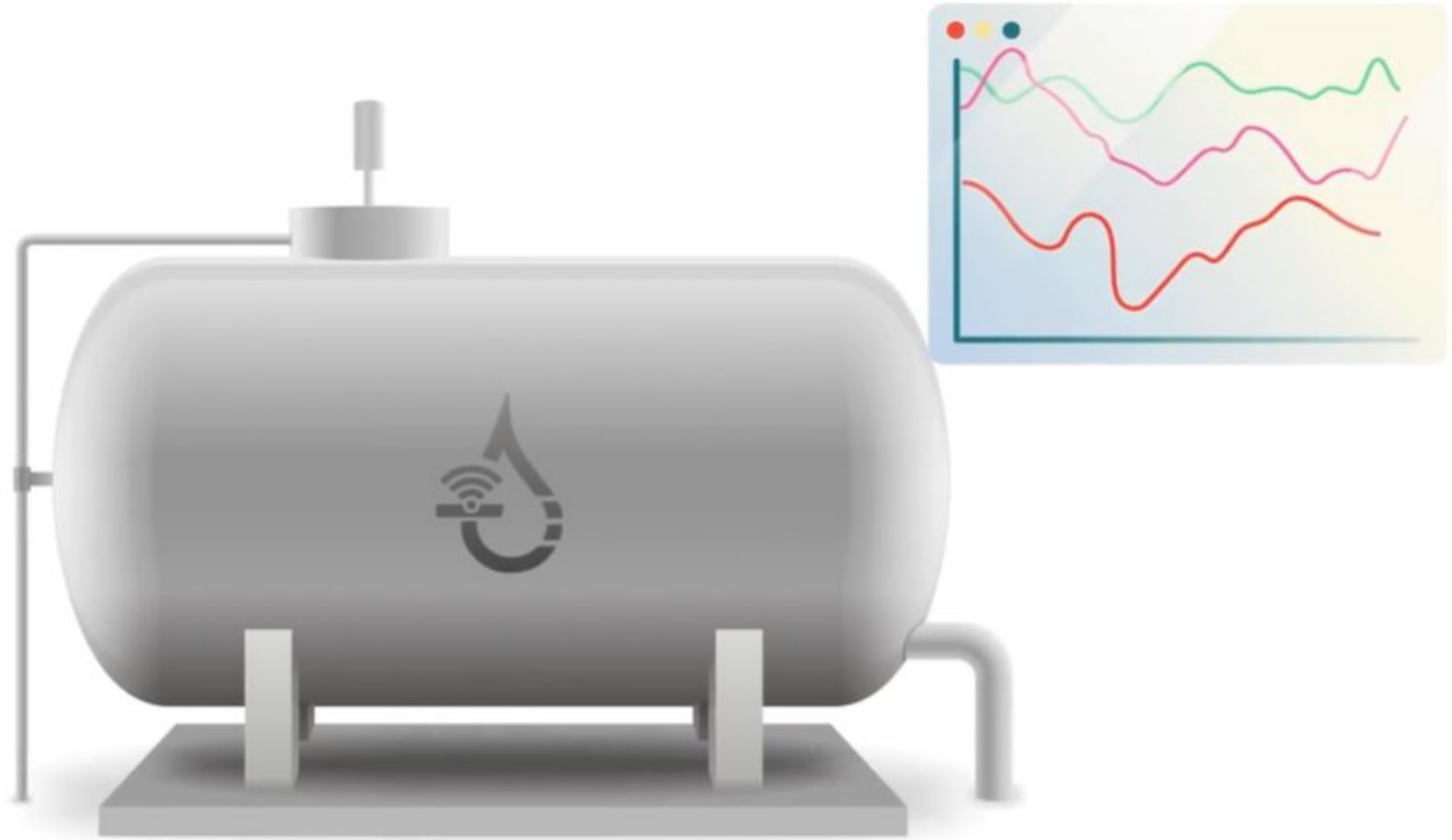
Tank Dimensions

Length: 3.750 m
Width: 4.650 m
Height: 2.743 m
Slope: 0.05 m
sg: 0.835 kg/l

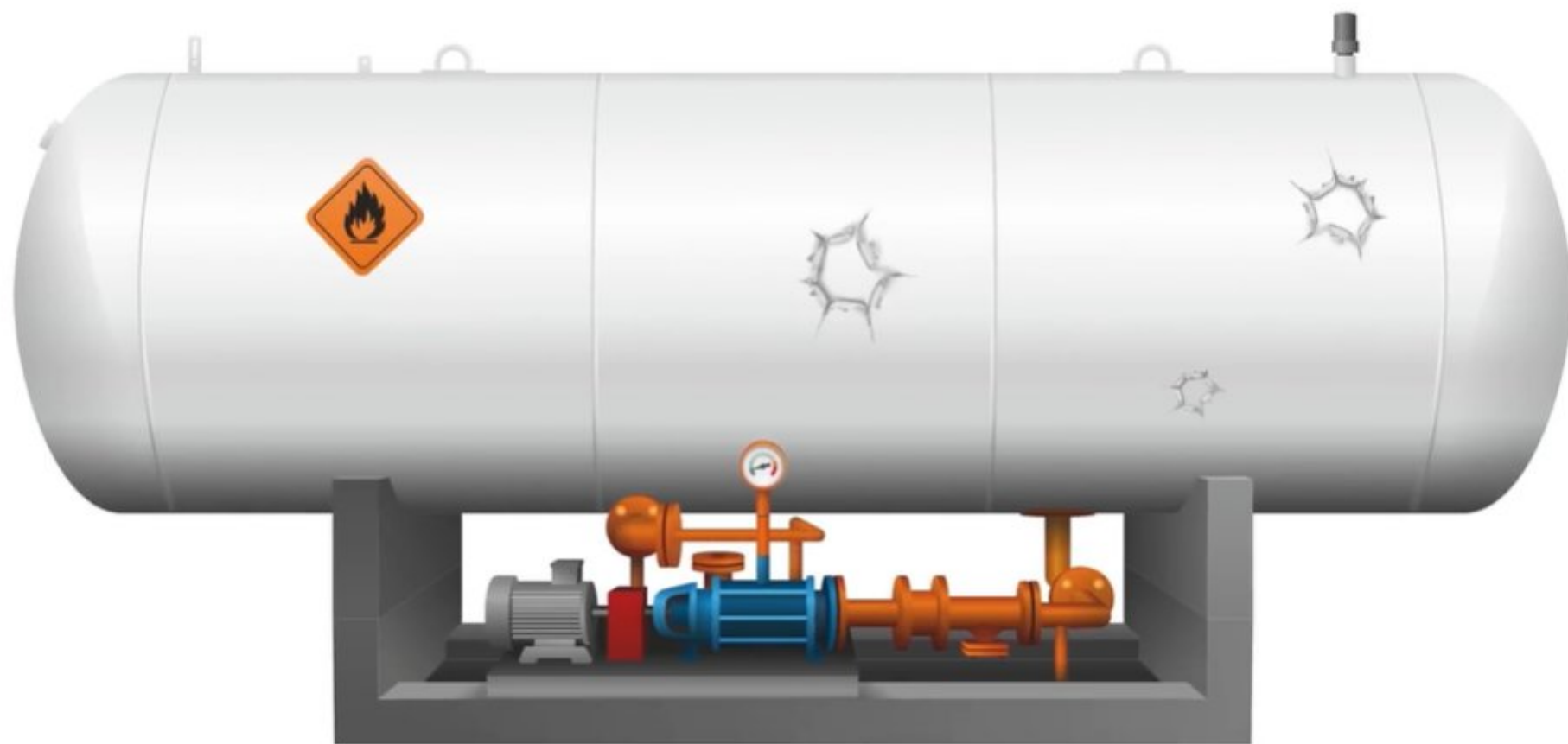
Tank Volume

Brim: 47831 litres
Usable: 47395 litres
Measurable: 47831 litres

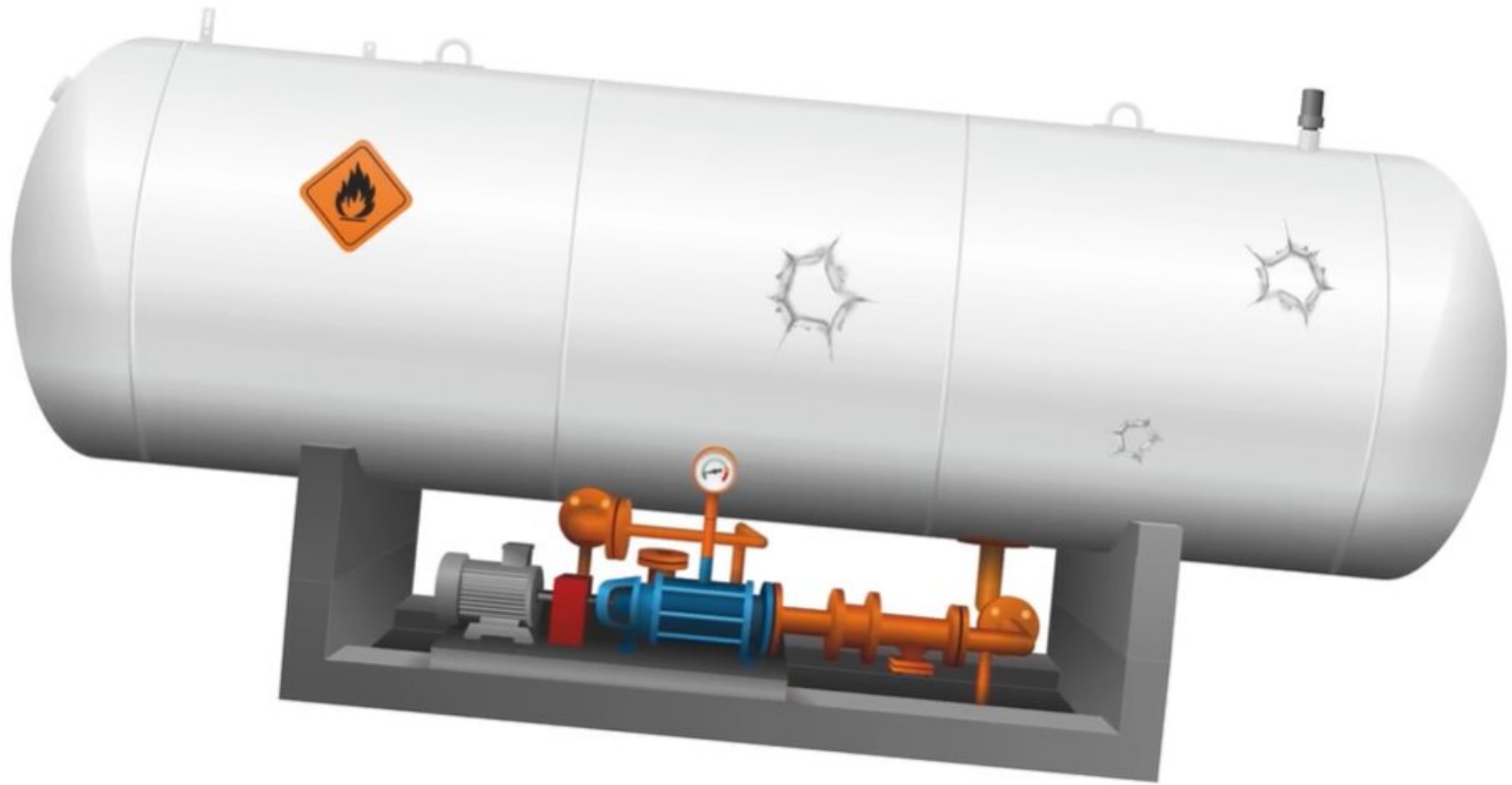
Height, mm	Volume, L
0	0
115	2000
230	4000
345	6000
459	8000
574	10000
688	12000
803	14000
918	16000
1 032	18000
1 147	20000



TANKS TEND TO CHANGE THEIR PARAMETERS OVER TIME



TANK BODY DEFORMATION

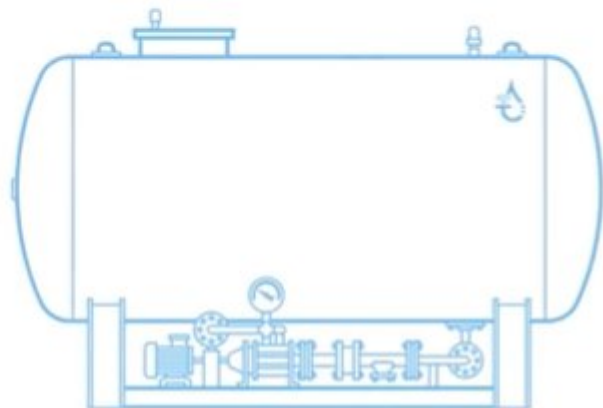


TANK TILT

FOREIGN OBJECTS GETTING INSIDE THE TANK



INITIAL CALIBRATION CHART BECOMES UNRELIABLE

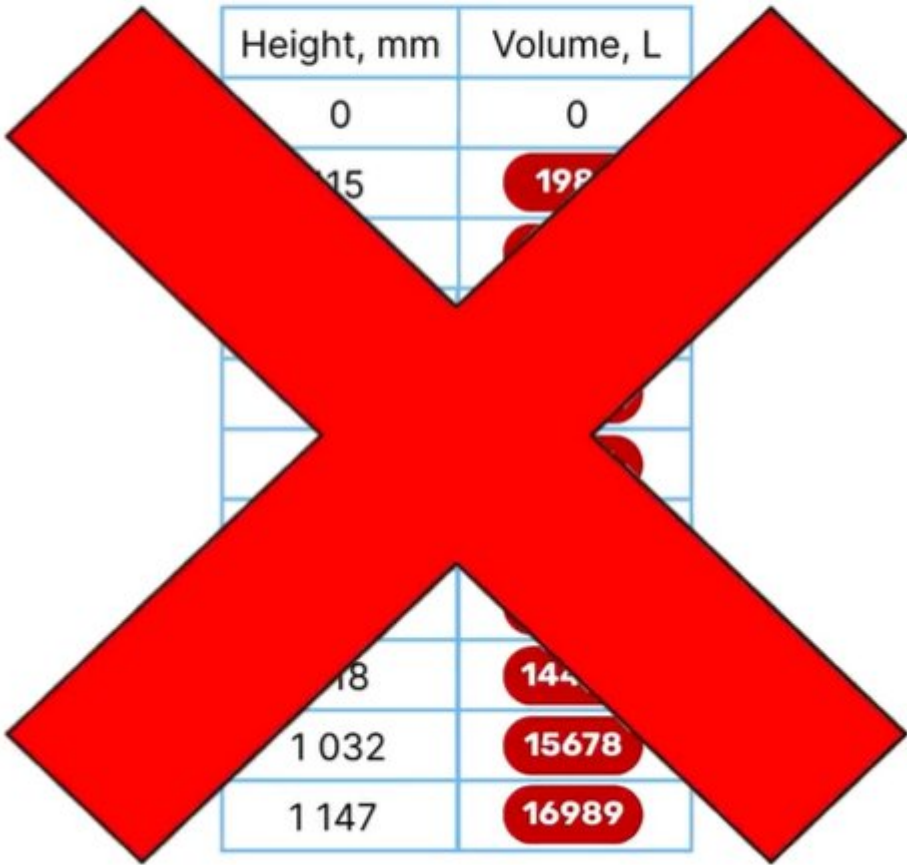


Tank Dimensions

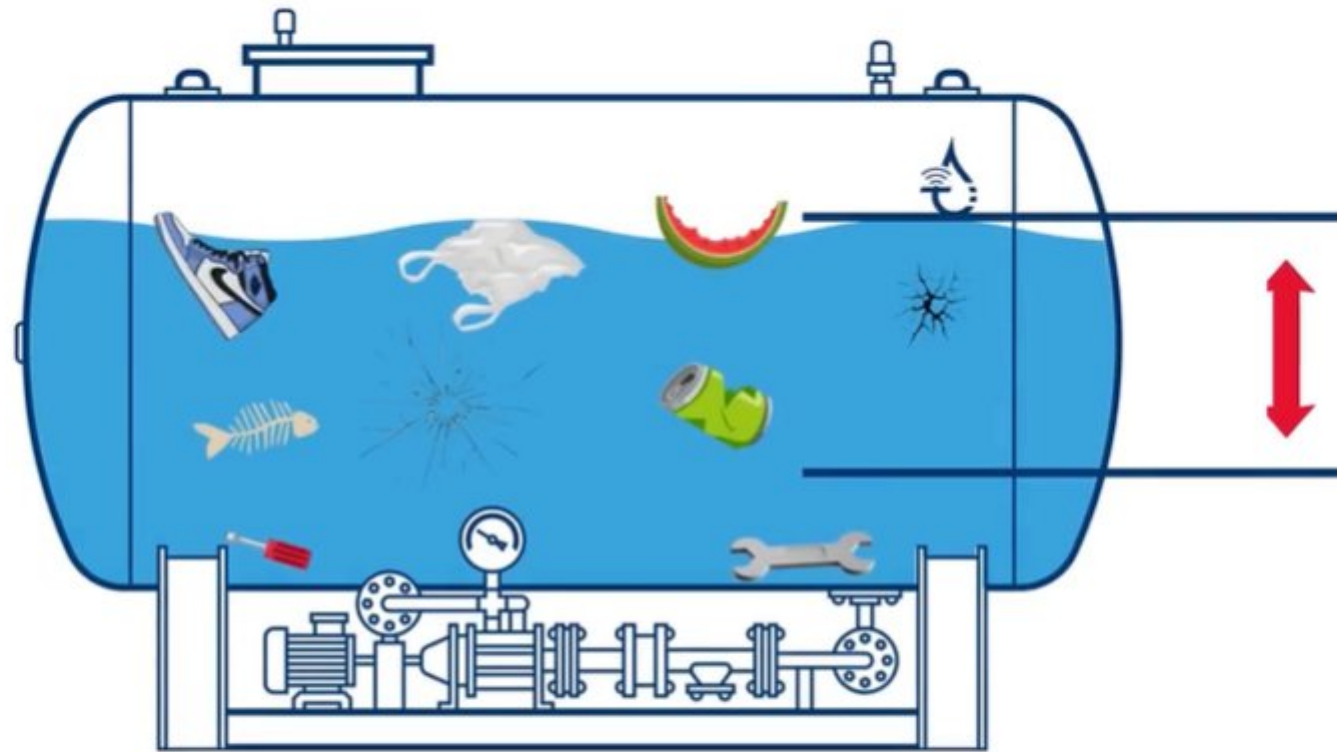
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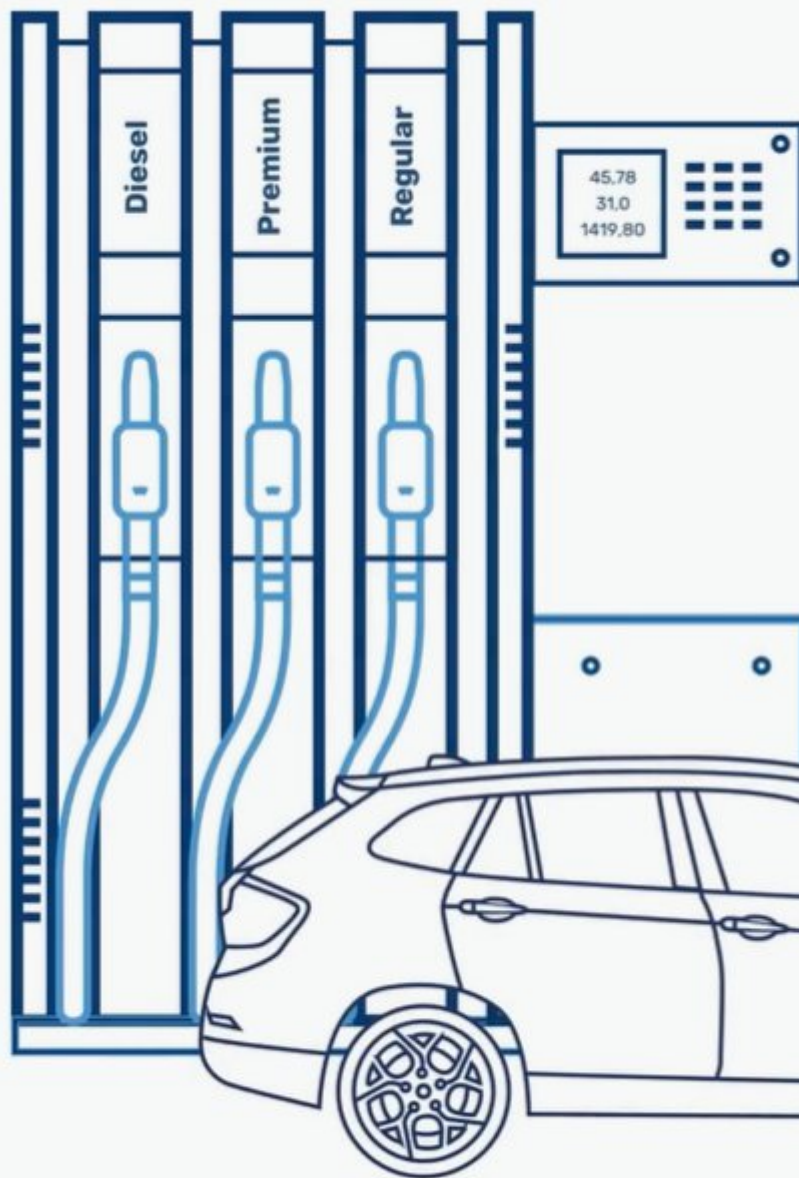
Height, mm	Volume, L
0	0
15	198
18	144
1 032	15678
1 147	16989



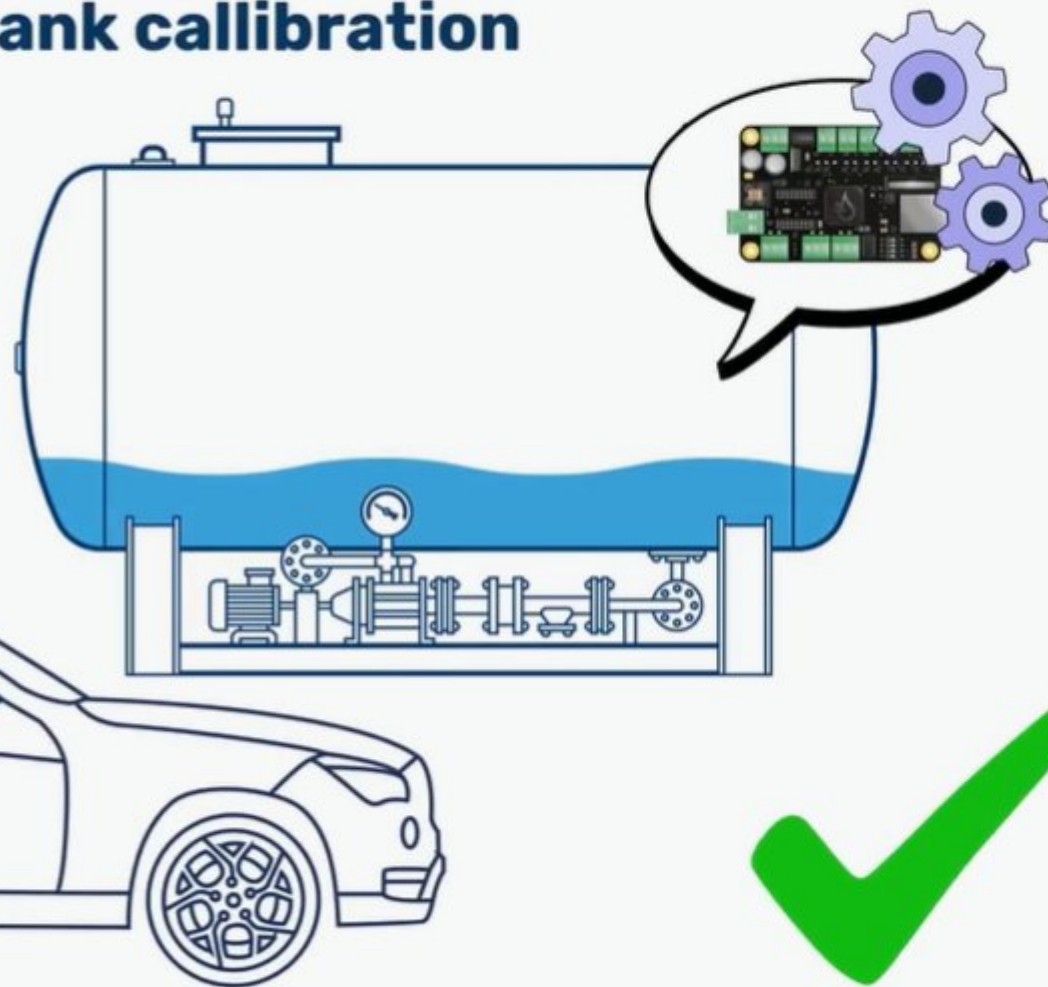
**FUEL VOLUME CALCULATED USING THE
CALIBRATION CHART**



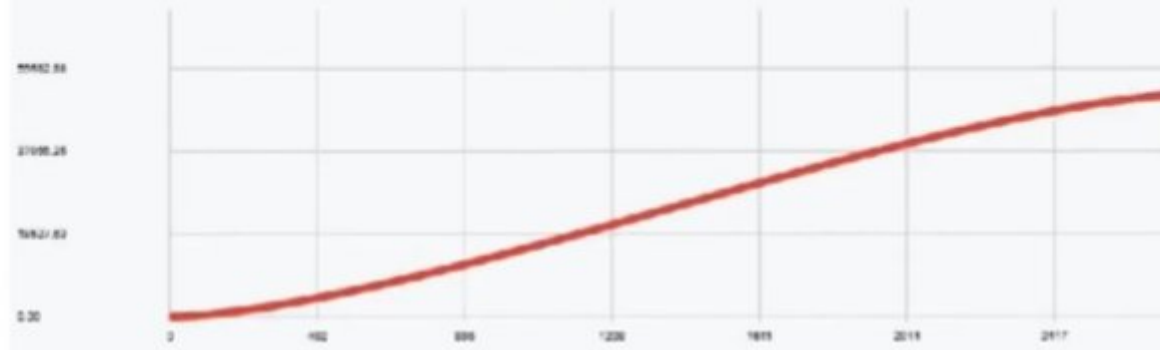
GAS STATION IS NOT OPERATIONAL DURING THE TANK CALIBRATION



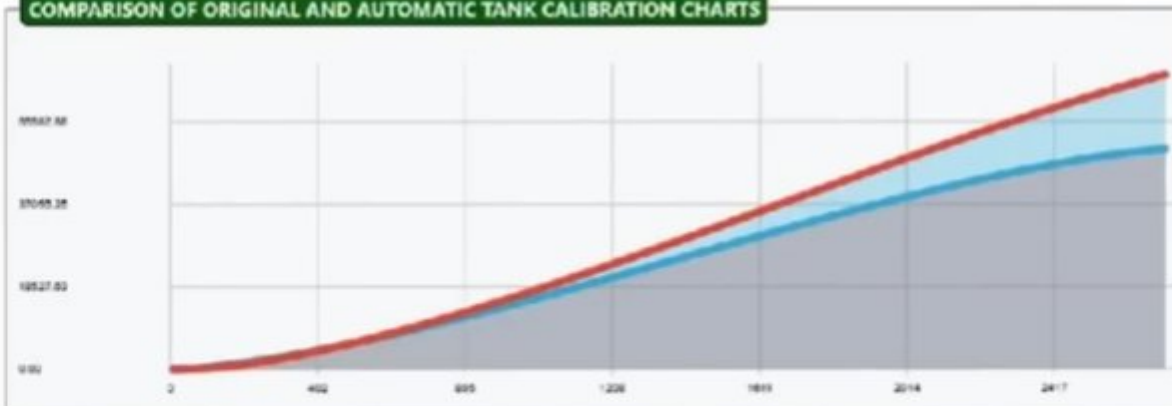
Gas station keeps working during tank calibration



Tank automatic calibration chart



COMPARISON OF ORIGINAL AND AUTOMATIC TANK CALIBRATION CHARTS



OFFLINE DISPENSER SALES MONITORING & ALERTS

Reporting / Alerts

Pumps

Tanks

Pumps and tanks reconciliation

GPS

Alerts

Report files

Date/time start22.04.25 14:46:35

Date/time end23.04.25 14:46:35

Generate report

ALERTS REPORT FROM 22.04.25 14:46:35 TILL 23.04.25 14:46:35, DEVICE ID: 801800043137511835363934

Copy

Excel

CSV

Print

Show entries

Search:

#	Date/time	Device type	Device number	State	Description
1	2025.04.22 16:05:55	PTS	-	Start	Restart detected
2	2025.04.22 16:05:55	PTS	-	End	Restart detected
3	2025.04.22 16:05:55	Reader	1	Start	Offline state detected
4	2025.04.22 16:06:05	Pump	1	Start	Offline state detected
5	2025.04.22 16:06:26	Pump	1	End	Filling in offline mode detected, nozzle 1

Showing 1 to 5 of 18 entries

Previous1234Next

Benefits of Offline Sales Tracking Module

- **Enhanced Fraud Protection:**

By detecting discrepancies in fuel dispenser totals, the system helps prevent and deter fraudulent activities.

- **Real-time Monitoring:**

Even in offline mode, the system provides timely alerts, enabling quick responses to potential issues.

- **Improved Security:**

The offline fraud detection feature enhances the overall security and safety of the fuel dispensing operations.

- **Reduced Risk:**

Minimizing the risk of financial losses due to unauthorized fuel dispensing.



CSA IDENTIFICATION & PUMP AUTHORIZATION



Customer Service Attendant Tag Reader

How does it work?

- Tag Readers attached to each filling position and connected to forecourt controller.
- Users (*) are assigned an individual contactless tags.
- User presents tag to readers to authorize each transaction.
- Transactions are assigned to users.
- Site managers get quick and easy reports with totals by user.

(*) Users = Attendant or Drivers or Customers.


Pre Authorisation

- Fast pump authorization
- 3 forms of user feedback to make transactions simple for users
- Built-in transaction messages
- Reliable, purpose built, easy to use, cost effective terminal







Branded CSA Cards



CSA CARD MANAGEMENT PORTAL





PERUZ AUTOMATION SOLUTIONS

All stations







PTS name	Operator tag	Attendant's name	Operator activity
Site No2-1	123456789kiytrd1254	4643363453556w3	<input checked="" type="checkbox"/>
Site No2-1	fdsrty25414et45521xsk	4643363453556w3	<input checked="" type="checkbox"/>
1030	ebcbaf143aa564e8	5tka	<input type="checkbox"/>
1030	65464564564f3487	ww	<input type="checkbox"/>
1030	7df3d4b76d336414	Asd	<input type="checkbox"/>
Site No2-1	0000000002615575	4643363453556w4	<input checked="" type="checkbox"/>
Site No2-1	0498479845345445	4643363453556w3	<input checked="" type="checkbox"/>
Site No2-1	8798455646564954	4643363453556w2	<input checked="" type="checkbox"/>
Site No2-1	0954645654654564	4643363453556w1	<input checked="" type="checkbox"/>

PTS products

Tanks

Nozzles

Price Boards

Readers

Attendant tags

Daily Processing Time

Pump ports configuration

Probe ports configuration

Price board ports configuration

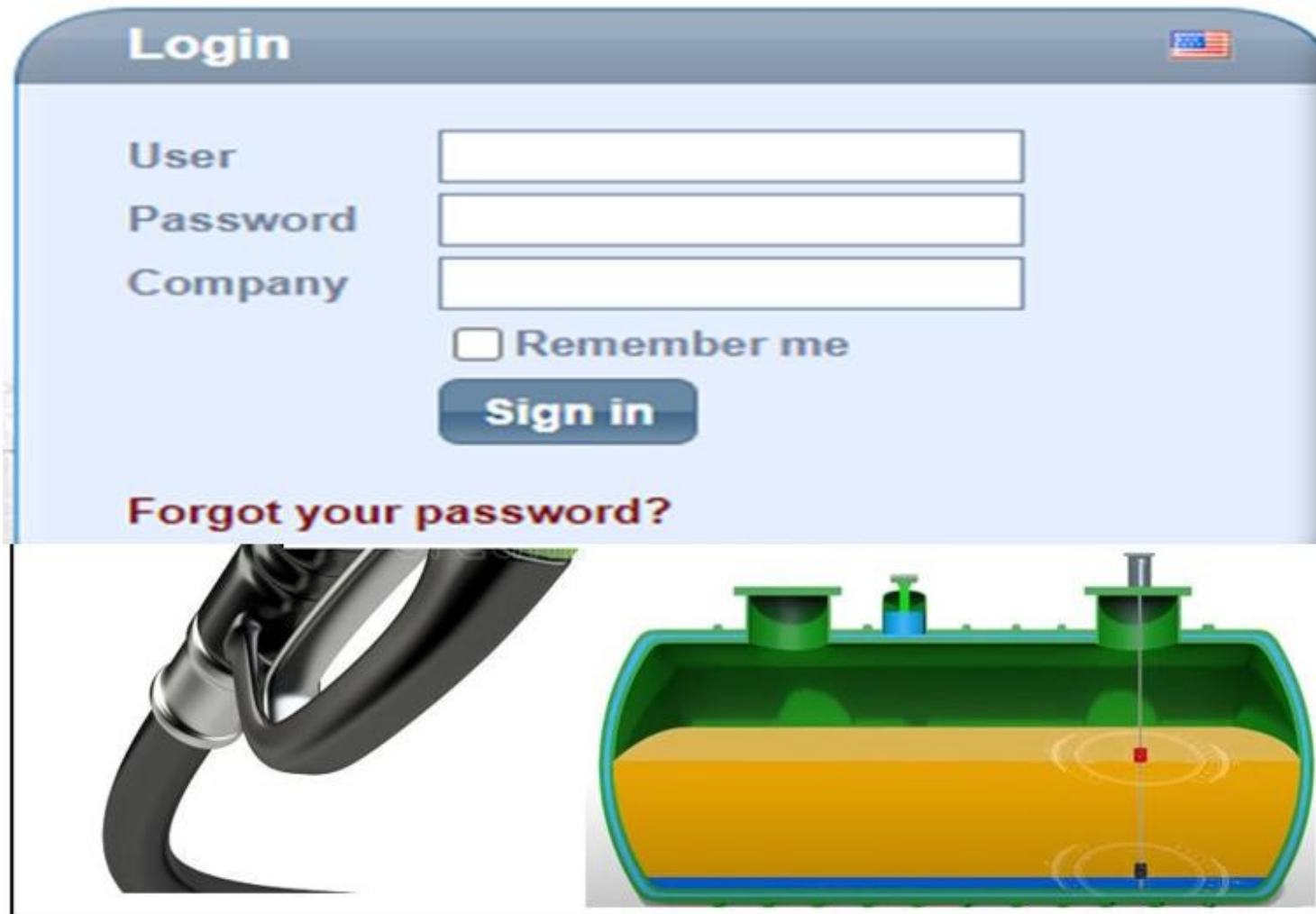
Readers ports configuration

CSA RFID Tags Management

Automated Sites Remote Access

The Fuel Management System is a web-based solution which allows the users and admins to login remotely and access the status of the system, sales and stocks reports as generated by the system installed at the fuel stations and fuel depots.

The system is accessible on a website using the defined login accounts and login credentials.



SITE, AUTOMATED EQUIPMENT STATUS DASHBOARD



Home

System configuration



Station network settings



Fuel types



PTS Configuration



RH DEVANI LTD



Site Status



Total Site

1



Online

1



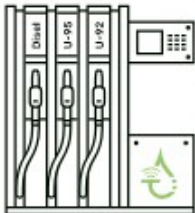
Total Probes

3



Online

3



Total DU

4



Online

4



Home



Reports

Transactions

Daily sales

Sales per fuel grade

Attendant sales per fuel grade

Sales per attendant

Sales per pumps and nozzles

Sales per pump

Pumps and tanks reconciliation

Shift report



REPORTS TAB



Site Status



Total Site

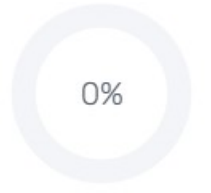
1



100%

Online

1



0%

Offline

0



Total Probes

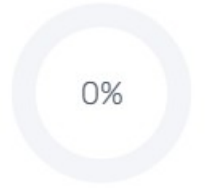
3



100%

Online

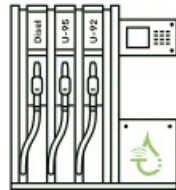
3



0%

Offline

0



Total DU

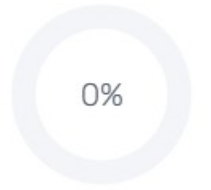
4



100%

Online

4



0%

Offline

0

Payment Channels



100.00%

0.00%

0.00%

Active

Go to S

CSA DAILY/SHIFT/PERIODIC SALES REPORT



Home



Reports

Transactions

Daily sales

Sales per fuel grade

Attendant sales per fuel grade

Sales per attendant

Sales per pumps and nozzles

Sales per pump

Pumps and tanks reconciliation

Shift report

Tank monitoring



LAARE SHELL STATION



Date	Station	PTS name	Attendant's name	Volume	Sales incl. VAT	Sales without VAT
2025-12-16	LAARE SHELL STATION	LAARE SHELL STATION	FELISTER KAWIRA	218.2	41612.77	41612.77
2025-12-16	LAARE SHELL STATION	LAARE SHELL STATION	INVOICES	275.66	50703.3	50703.3
2025-12-16	LAARE SHELL STATION	LAARE SHELL STATION	JULIA KANARIO	224.16	42212.03	42212.03
2025-12-16	LAARE SHELL STATION	LAARE SHELL STATION	DOROTHY KAJUJU	488.27	92096.01	92096.01
2025-12-16	LAARE SHELL STATION	LAARE SHELL STATION	JUDY KAMAMI	170.68	32478.97	32478.97
2025-12-15	LAARE SHELL STATION	LAARE SHELL STATION	FELISTER KAWIRA	414.91	78408.53	78408.53
2025-12-15	LAARE SHELL STATION	LAARE SHELL STATION	DOROTHY KAJUJU	343.14	64164.18	64164.18
2025-12-15	LAARE SHELL STATION	LAARE SHELL STATION	INVOICES	686.98	123127.23	123127.23
2025-12-15	LAARE SHELL STATION	LAARE SHELL STATION	JULIA KANARIO	130.58	24900.89	24900.89
2025-12-15	LAARE SHELL STATION	LAARE SHELL STATION	FELIX MUTHURI	192.33	36360.53	36360.53
2025-12-15	LAARE SHELL STATION	LAARE SHELL STATION	JUDY KAMAMI	383.02	71932.99	71932.99
2025-12-15	LAARE SHELL STATION	LAARE SHELL STATION	JUDY KAWIRA	296.21	55144.98	55144.98
2025-12-15	LAARE SHELL STATION	LAARE SHELL STATION	FIDES KAMATHI	754.74	142087.72	142087.72



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Transactions

Daily sales

Sales per fuel grade

Attendant sales per fuel grade

Sales per attendant

Sales per pumps and nozzles

Sales per pump



SALES PER PRODUCT



Date	Station	PTS name	Fuel grade	Volume	Sales incl. VAT	Sale
2025-04-01	RH DEVANI LTD	RH DEVANI LTD	PETROL	379.69	379.5	
2025-04-01	RH DEVANI LTD	RH DEVANI LTD	DIESEL	1804.6	1804.6	
2025-03-29	RH DEVANI LTD	RH DEVANI LTD	DIESEL	2677.01	2677.1	
2025-03-29	RH DEVANI LTD	RH DEVANI LTD	PETROL	554.01	553.7	
2025-03-28	RH DEVANI LTD	RH DEVANI LTD	KEROSENE	400	400	
2025-03-28	RH DEVANI LTD	RH DEVANI LTD	DIESEL	4638.44	4638.3	
2025-03-28	RH DEVANI LTD	RH DEVANI LTD	PETROL	1027.1	1026.7	
2025-03-27	RH DEVANI LTD	RH DEVANI LTD	PETROL	886.13	885.8	
2025-03-27	RH DEVANI LTD	RH DEVANI LTD	KEROSENE	1080	1080	



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Daily sales

Sales per fuel grade

Attendant sales per fuel grade

Sales per attendant

Sales per pumps and nozzles

Sales per pump

Pumps and tanks reconciliation



PERIODIC STOCK VS SALES RECONCILIATION REPORT



Station	Tank number	Fuel grade	Product volume on st...	Sum
RH DEVANI LTD	1	KEROSENE	0	
RH DEVANI LTD	2	PETROL	3334	
RH DEVANI LTD	3	DIESEL	6937	
			4608	

APPLY

RESET ALL

Date & time start



ADD

RANGE

2025-04-01 00:00:00



Date & time end



ADD

RANGE

2025-04-02 00:00:00



Activate Windows

Go to Settings to activate Windows.



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Tank monitoring

Daily fuel remains

Fuel level changes

In-tank deliveries

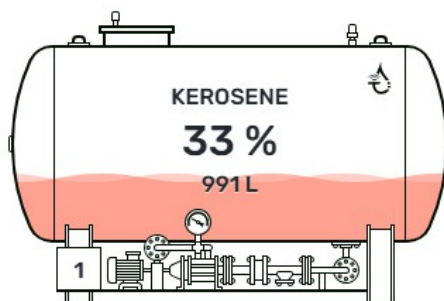
Tank current state

Manual in-tank deliveries

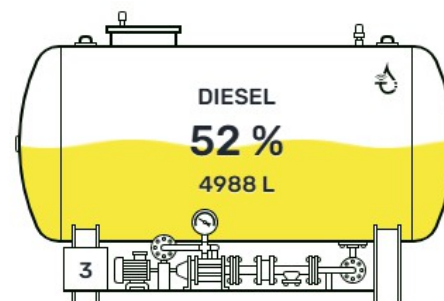
Manual tank current state



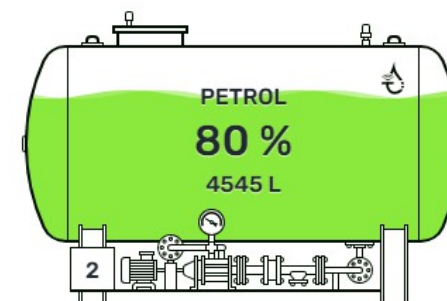
REAL TIME TANK INVENTORY DATA



Station	: RH DEVANI LTD
PTS name	: RH DEVANI LTD
Tank number	: 1
Fuel grade	: KEROSENE
Tank Height	: 1585
Fuel height (%)	: 33
Probe status	: OK
Alarm code	:
Product height (mm)	: 499.9
Capacity (l)	: 991
Product temperature compensated volume (l)	: 980
Product ullage (l)	: 2078
Product mass (kg)	: 0
Product temperature °C	: 23.3
Product density (k/l)	: 0
Water height (mm)	: 47.3
Water volume (l)	: 41



Station	: RH DEVANI LTD
PTS name	: RH DEVANI LTD
Tank number	: 3
Fuel grade	: DIESEL
Tank Height	: 1910
Fuel height (%)	: 52
Probe status	: OK
Alarm code	:
Product height (mm)	: 924.7
Capacity (l)	: 4988
Product temperature compensated volume (l)	: 4954
Product ullage (l)	: 4651
Product mass (kg)	: 0
Product temperature °C	: 23.2
Product density (k/l)	: 0
Water height (mm)	: 0
Water volume (l)	: 0



Station	: RH DEVANI LTD
PTS name	: RH DEVANI LTD
Tank number	: 2
Fuel grade	: PETROL
Tank Height	: 1550
Fuel height (%)	: 80
Probe status	: OK
Alarm code	:
Product height (mm)	: 1014.1
Capacity (l)	: 4545
Product temperature compensated volume (l)	: 4492
Product ullage (l)	: 1154
Product mass (kg)	: 0
Product temperature °C	: 24.2
Product density (k/l)	: 0
Water height (mm)	: 0
Water volume (l)	: 0

Activate Windows



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Tank monitoring

Daily fuel remains

Fuel level changes

In-tank deliveries

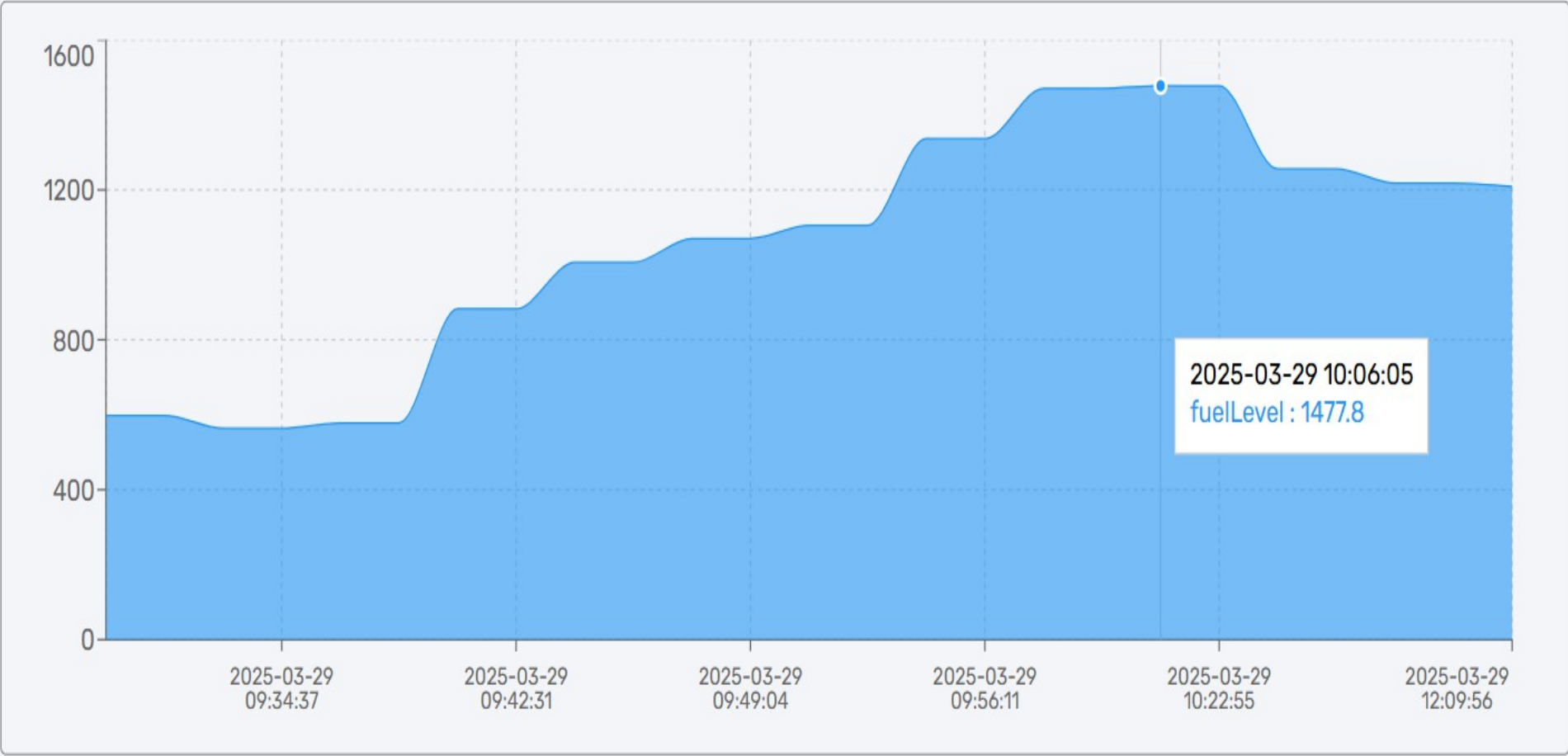
Tank current state



Graphical Tank Inventory Data



Fuel level changes





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Tank monitoring



Daily fuel remains

Fuel level changes

In-tank deliveries

Tank current state


Manual in-tank deliveries



Tank Delivery Data



Date	Station	PTS name	Tank number	Fuel grade	Capacity (l)
2025-04-01	RH DEVANI LTD	RH DEVANI LTD	3	DIESEL	1984
2025-04-01	RH DEVANI LTD	RH DEVANI LTD	3	DIESEL	1984
2025-03-29	RH DEVANI LTD	RH DEVANI LTD	3	DIESEL	6049
2025-03-29	RH DEVANI LTD	RH DEVANI LTD	1	KEROSENE	2059
2025-03-29	RH DEVANI LTD	RH DEVANI LTD	1	KEROSENE	2059
2025-03-29	RH DEVANI LTD	RH DEVANI LTD	1	KEROSENE	2059
2025-03-29	RH DEVANI LTD	RH DEVANI LTD	3	DIESEL	6049
2025-03-29	RH DEVANI LTD	RH DEVANI LTD	1	KEROSENE	2059
2025-03-28	RH DEVANI LTD	RH DEVANI LTD	3	DIESEL	3078



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Tank monitoring

Daily fuel remains

Fuel level changes

In-tank deliveries

Tank current state

Manual in-tank deliveries

Detailed Tank Delivery Data						
Fuel grade	Tank number	Move type	Volume delivery	Users	Comment	Date
PETROL	2	Receipt	2000	IVY	LAKE OIL; RHD1121326[20128]- JOSEPH MATHENGE- KBA 457W	2025-03-
PETROL	2	Receipt	3000	IVY	LAKE OIL; RHD1121194[20121]- BARRACK OTIENO- KCT 552Z	2025-03-
DIESEL	3	Receipt	4000	IVY	LAKE OIL; RHD1121198[20121]- BARRACK OTIENO- KCT 552Z	2025-03-
KEROSENE	1	Receipt	3000	IVY	LAKE OIL; RHD1121194[20121]- BARRACK OTIENO- KCT 552Z	2025-03-
DIESEL	3	Receipt	2000	IVY	IK; RHD1121188[405855... KBV 868N- EVANS	2025-03-
DIESEL	3	Receipt	2000	IVY	LAKE OIL; RHD1121138[20119]- SAMUEL MWANIKI- KBD 341W	2025-03-
DIESEL	3	Receipt	2000	IVY	LAKE OIL; RHD1121134[20118]- BARRACK OTIENO- KCT 552Z	2025-03-
DIESEL	3	Receipt	3000	IVY	LAKE OIL; RHD1121077[035617]- JOSEPH MATHENGE- KBA 457W	2025-03-
DIESEL	3	Receipt	2000	IVY	LAKE OIL; RHD1121064[20112]- EVANS MWANGI- KBV	2025-03-



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Reports



Tank monitoring



Price management



Price setting

Price change record



REMOTE FUEL PRICE MANAGEMENT



PTS name	Fuel grade	Price
RH DEVANI LTD	PETROL	1
RH DEVANI LTD	DIESEL	1
RH DEVANI LTD	KEROSENE	1