



Tank Inventory Management Systems

Liquid Inventory Management System For LPG Storage Terminals

LIQUID INVENTORY MANAGEMENT SYSTEM (LIMS)

In pressurised storage applications (eg. LPG, Ammonia, Butadiene, Propylene, Propane, Butane, etc.), the stored product is in Liquid state & the space above the product is in Vapour state. Level measurement systems measure only the level of liquid component of the product. During loading and unloading of the product, there is transformation of vapour components into liquid and vice-versa. This causes errors in the net inventory calculations derived from the liquid level measurement alone.

LIMS provides a complete solution. LIMS provides measurement of liquid as well as vapour components of product giving accurate inventory reports.

SBEM provides a complete solution for accurate measurement of the product. SBEM uses LPG Servo Gauge as a level sensor. The gauge measures innage / level of liquid as well as ullage / liquid in vapour above the product. In addition the system uses a temperature sensor & a HART Pressure Transmitter. The Vessel Calibration Chart, ASTM volume & density reduction tables are stored in LPG Servo Gauge. By utilising the level, temperature, density & vapour pressure, the system calculates the accurate stock of product in volume as well as mass system

FEATURES & BENEFITS

- Most reliable, proven means / method of Inventory Measurement - No manual calculations
- Built-in Software to calculate mass of liquid and vapour
- Instantaneous, on-line, hard copy Inventory reports at user programmable time intervals or on demand through a printer connected to LPG CIU.
- Stand-alone system with dedicated Hardware
- Cost effective solution using a HART Pressure Transmitter that fits on Calibration Chamber itself, No extra nozzle required
- Retrofit system suitable for in-service as well as new Installations
- No Computers, No Software to pay for.
- Level, Temperature, Vapour Pressure & Density – all measurements in one system
- Display of Inventory calculations in pump house and S&D block
- Manual entry of Pressure & Density possible

LPG INVENTORY REPORT				
DATE : 30.04.1999				
TIME : 14.50				
PARAMETER	VESSEL.1	VESSEL.2	VESSEL.3	VESSEL.4
LEVEL (mm)	5243	10394	5243	10394
LIQUID TEMPERATURE (°C)	15.0	15.0	15.0	15.0
VAPOUR PRESSURE (Kg/cm ²)	4.5	4.5	4.5	4.5
VAPOUR TEMPERATURE (°C)	20.0	20.0	20.0	20.0
LIQUID VOLUME @ 15 °C (Lit.)	626000	1878000	626000	1878000
LIQUID EQ. VAPOUR VOLUME (Lit.)	52000	25000	52000	25000
❖ DENSITY @ 15°C (Kg/Lit.)	0.56	0.56	0.56	0.56
MASS OF LIQUID (MT)	350.0	1050.0	350.0	1050.0
MASS OF VAPOUR (MT)	29.0	14.0	29.0	14.0
TOTAL MASS (MT)	379.0	1064.0	379.0	1064.0
❖ MANUAL ENTRY				

LPG SERVO GAUGE (LPG SG)

The 139M LPG Servo Gauge is an intelligent, microprocessor-based instrument - a variant of field proven Servo Gauge, with the addition of an interface for HART Pressure Transmitter (to measure vapour pressure). Vessel Calibration charts and ASTM tables are stored in an EPROM in the gauge. This permits calculation of the liquid equivalent of vapour. Remote indication of all measured and calculated data is available in pump house - on the Tank Side Indicator Controller (TSIC) and in Control room on the LPG Communication Interface Unit (LPG CIU).

The standard 139 M Servo Gauge can be converted into LPG Servo Gauge, by adding a HART interface card and replacing the communication card.

LPG COMMUNICATION INTERFACE UNIT (LPG CIU)

The LPG Communication Interface Unit (LPG CIU) is a variant of the field proven CIU. All the LIMS parameters are measured and calculated for upto 16 LPG Servo Gauges. The LPG CIU collects, displays and sends data to a standard 80 column dot matrix printer connected to it

It can generate Vessel Level, Temperature, Density, Volume & Mass reports. It can function as a stand-alone unit for real time monitoring of all the parameters. In the absence of pressure transmitter, Vapour Pressure can be manually entered into the LPG CIU to give Volume and Mass data. (For more information, refer to leaflet LF-133-0818)

Liquid Inventory Measurement:

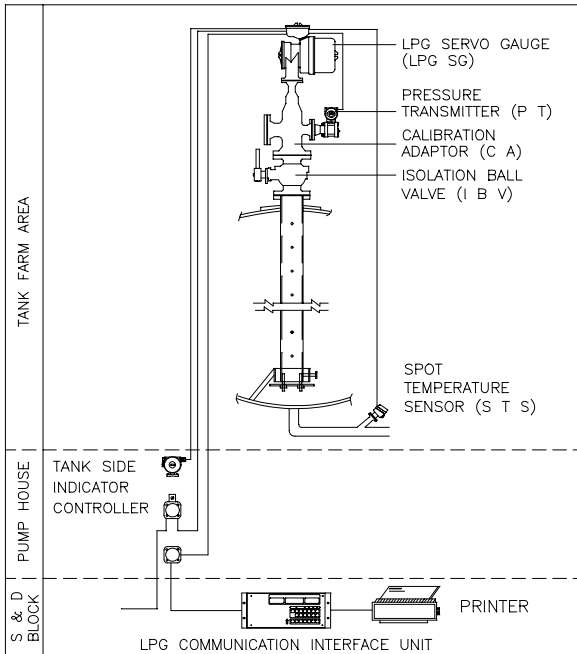
Accuracy: $\pm 1.3\%$ of reading with LPG Density¹
 $\pm 0.3\%$ of reading with manually entered density²

Resolution: 0.01 Metric Ton

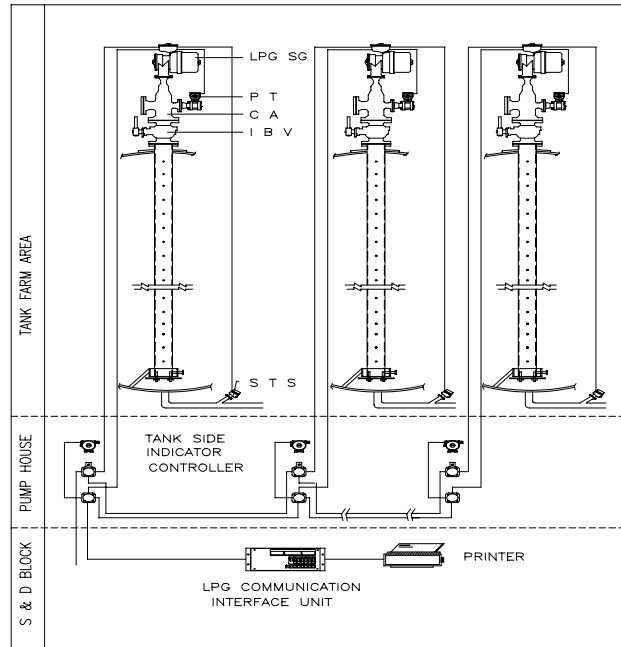
1. Accuracy is for the Sphere dia. of 18 m, Liquid level 10 m, Liquid density 0.55 gm/cc, Liquid temperature 25.0 °C Vapour temperature 30.0° C, Vapour Pressure 6.0 kg/cm², Pressure Transmitter with - range of 1000 psi (70 kg/cm²), Calibrated Span 30 kg/cm² and accuracy of 0.1% of calibrated span.
2. Accuracy of density assumed as 0.0006 gm/cc

GENERAL ARRANGEMENT OF LIQUID INVENTORY MANAGEMENT SYSTEM

SINGLE VESSEL INSTALLATION



MULTIPLE VESSEL INSTALLATION



*** Continuous developments may necessitate changes without notice.

LF-139-0816 Rev02. 05/2002



SBEM Pvt. Ltd.

39, Electronic Co-Operative Estate, Pune-Satara Road, Pune - 411 009 (INDIA)

Tel.: 91-20-4220505, 4223375 Fax - 91-20-4215670

Email: sales@sbem.co.in, sbemsales@vsnl.com, Web: www.sbem-india.com



Works:	Bibwewadi Industrial Estate, 691/A/2, Pune-Satara Road, Pune-411 037(India)	Email:	mfg@sbem.co.in	
Office:	MUMBAI	CHENNAI	NEW DELHI	VADODARA
Tele.:	91-22-2782 3601, 2782 3603	91-44-2445 1235, 2441 2947	91-11-2656 0647, 2696 9679	91-265-233 5196, 235 8184
Fax:	91-22-2782 3603	91-44-2441 2947	91-11-2696 9679	91-265-233 0906
Email:	mumbai@sbem.co.in	chennai@sbem.co.in	newdelhi@sbem.co.in	vadodara@sbem.co.in