



ISA Delhi Section

Setting the Standard for Automation™

TOTAL TANK SOLUTION FOR EMISSION CONTROL

Presented by : B. Balakrishnan
Product Marketing Manager, Emerson Asia Pacific
17th December 2022, New Delhi, India

ISA-D: “Fertiliser , Food and Pharma Symposium-2022”

Copyright 2022. ISA. All rights reserved. www.isadelhi.org

Tank Pressure Management Solutions with Remote monitoring



B. Balakrishnan

B. Balakrishnan is currently working as the Product Marketing Manager for Steam products for Emerson's Asia Pacific business, wherein he is the Subject Matter Expert (SME) in the Steam industry applications, products, solutions, and emerging technology trends.

Balakrishnan brings with him over 17+ years of professional experience in areas of Process R&D, Business Development, Strategic Planning, Project management and Product marketing. Balakrishnan has been with Emerson from over 7 years handling products ranging to variety of applications such as Tank Safety, Steam applications, industrial process applications and cryogenic applications. Prior to joining Emerson, he has over 11 years of technical expertise in steam sector and the products relevant to the Steam and condensate solutions.

B. Balakrishnan holds Bachelor of Engineering Degree in Mechanical Engineering from Kumarasamy College of Engineering, Karur, Tamil Nadu and Master of Science Degree in Manufacturing Management from BITS, Pilani, Rajasthan.

What is Coming Up (Agenda)

- Operational Risk
- Technologies offered
- Complete Tank solution
- Tank Walkdown - Reliability & Safety
- Q & A

Tank Farm Operators Face Substantial Operational Risks to Personnel, Product, Equipment, and the Environment



Fires

4000 MPH

Speed of an Unstable Detonation Flame for Most Fuels

Source: NFPA



Occupational

1 / 3300

Statistical Probability of Overfill During a Filling Operation

Source: Marsh and McLennan 2015



Product

\$5.5M

Approximate Value of Crude Oil

Source: NYMEX Spot Prices August 2021



Environmental

New VOC control regulations launched by China, many other Asian countries to follow suit

Source: Internal study

85%

Tank Accidents Caused by Fire or Explosions

Source: Journal of Loss Prevention in the Process Industries, A Study of Storage Tank Accidents, Chang & Lin

26%

Share of Tank Accidents Attributed to Terminals

Source: Journal of Loss Prevention in the Process Industries, A Study of Storage Tank Accidents, Chang & Lin

3x

Lost Product by 4th Quartile Terminal Operators Compared to Top Quartile Counterparts

Source: Internal Study

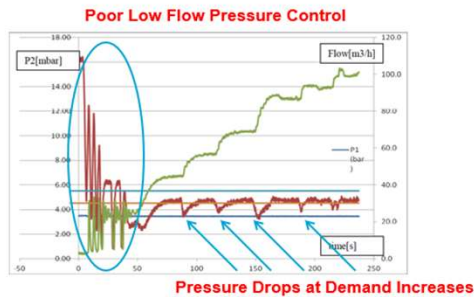
GB 37822-2019 standard enforced by China that came into effect from July 2020

Source: China-volatile-organic-compounds-VOC-s-management

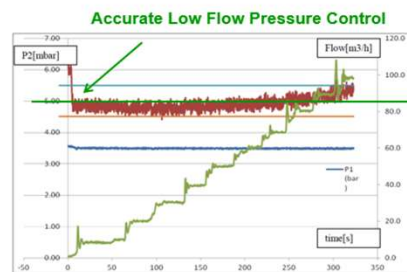
These Risks Affect Various Stakeholders and Have Explicit and Implicit Costs

“Low Setpoint technology” Regulators in Tank Blanketing can reduce your Nitrogen usage by 40% - saving \$0.5M / year in N2 cost

- **Precision sealing & low-set point regulator technology (0.25"wc)** afforded lower set points allowing decrease in nitrogen flow rate from 23 Nm³/hr to 0.05 Nm³/hr after the upgrade
- **Rapid response** to correct overpressure level when filling/ emptying tank.
- **Better accuracy** 95% accuracy with a pilot operated regulator delivers great promise

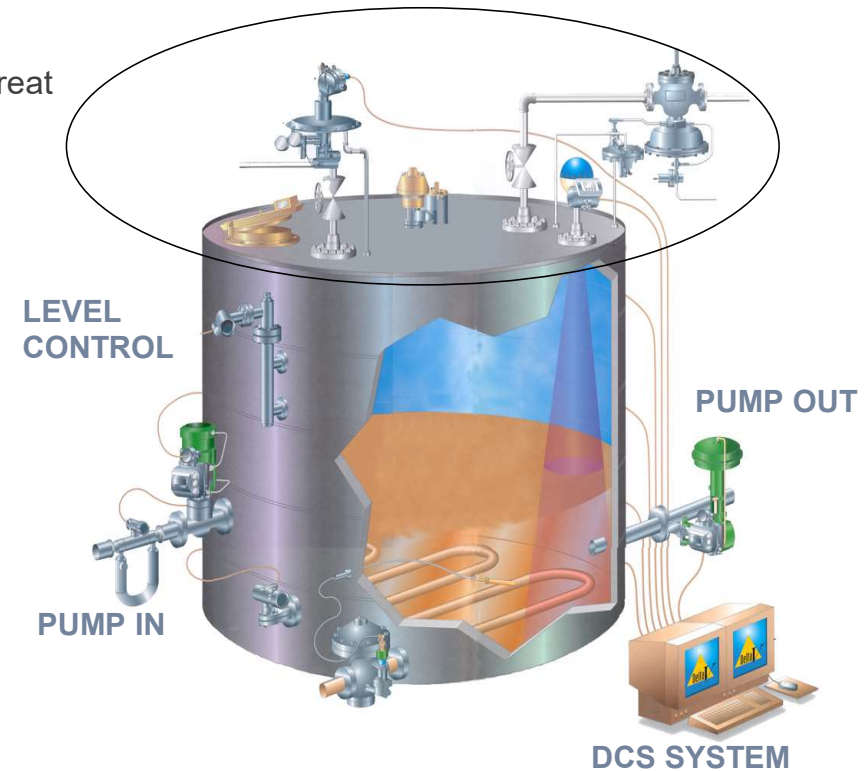


Control Valve



Regulator

TANK BLANKETING



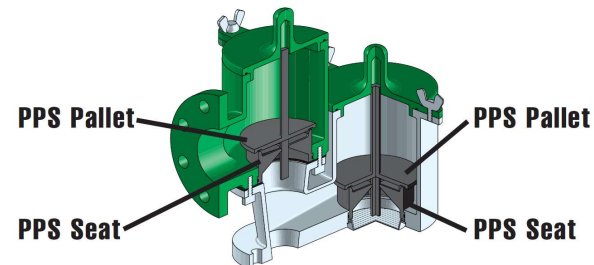
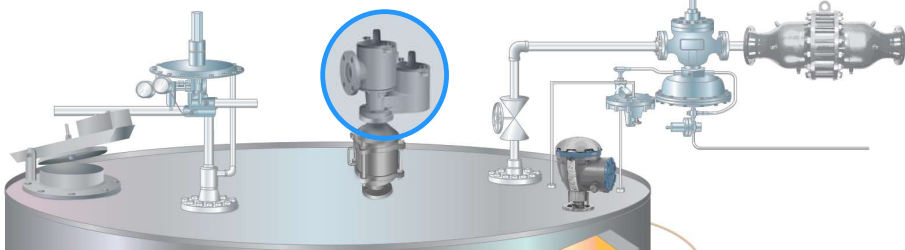
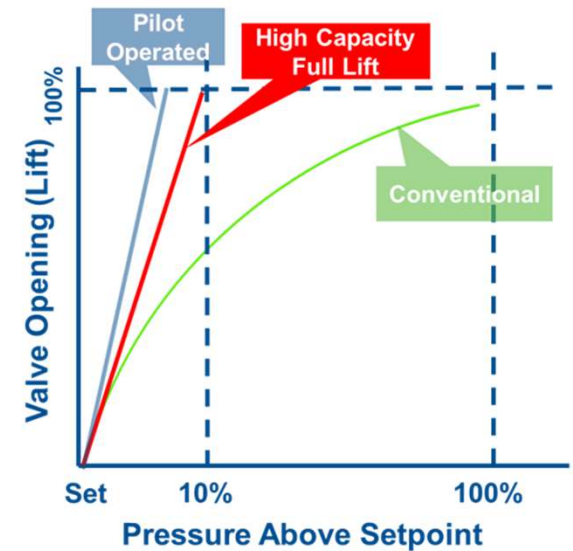
Pressure & Vacuum Relief Vents - Full lift at 10% overpressure allows higher settings containing emissions without compromising safety

Challenges

- *Freezing* or *sticking* from the stored product or weather
- *Excessive leakage* due to seat failures
- PVRV *monitoring*
- *Lower emissions* while granting overpressure protection

Emerson Solution

- *PPS* pallets and seals combined with internal PPS coating prevent freezing, stickiness and corrosion issues
- As low as 0.1 SCFH at 90% of set pressure and ambient conditions
- *Full lift at 10% overpressure* allows higher settings containing emissions without compromising safety
- *Wireless Monitoring*



Wireless Monitoring of Safety Valves Gives Operators the Visibility to Immediately Identify and Address Tank Pressure Abnormalities

Tank Pressure Control Challenges

Prevent Overpressure Events Causing Tank Damage

Very Difficult to Know When a Problem Exists Resulting in Environmental Issues & Fines

Vent Valves Located in Low Traffic Areas and Are Rarely Monitored

Significant Venting of Hydrocarbons from Tanks Found that Should be 100% Controlled

Enardo Wireless-Ready PVRV and EPRV



Built-In Proximity Switch to Detect Valve Position



Relay to WirelessHART® Gateway



Valve Position Sent to Control Room



Analyze Trends and Deploy Resources as Needed

Results



Monitor Tanks from the Safety of a Control Room & Reduce Frequency of Tank Top Walks



Detect Open Vent Valves for Maintenance or Emissions



Increase Response Time for Safety or Emissions Events



Improved Maintenance Efficiency

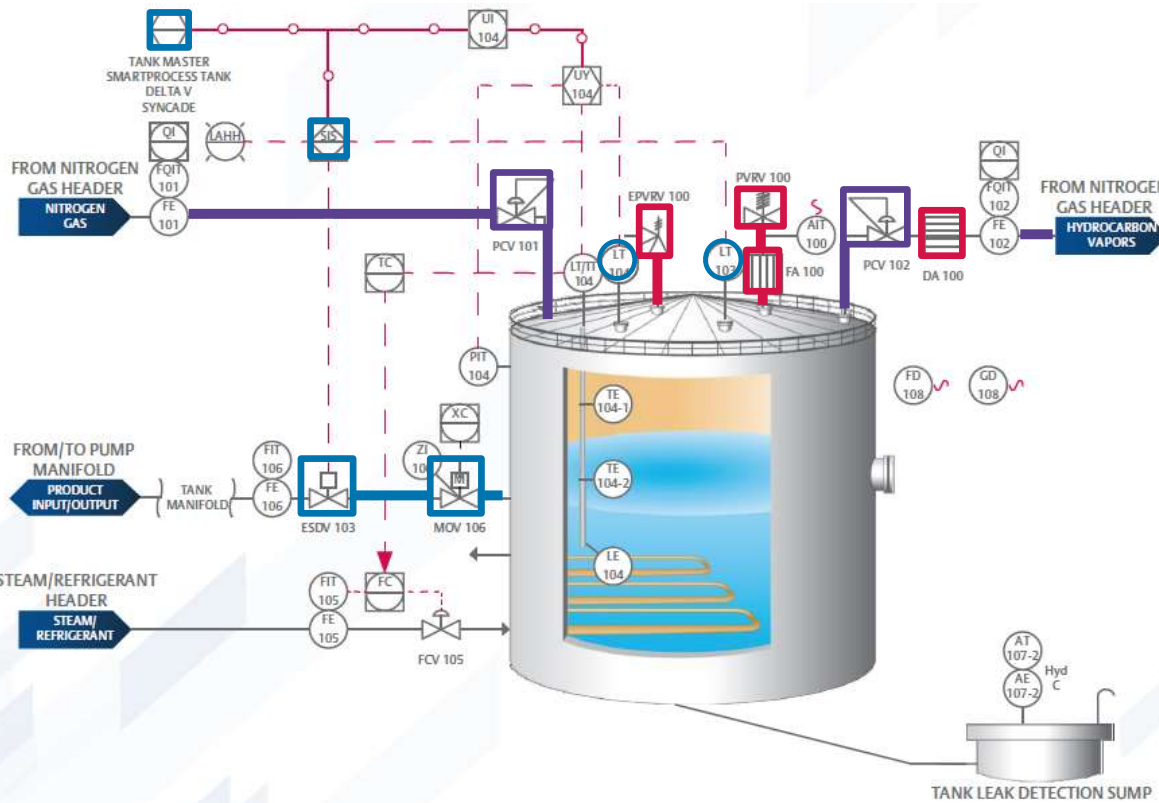
Emerson's Complete Portfolio of Tank Products Maximizes Reliability and Optimizes Tank Safety

Gas Space

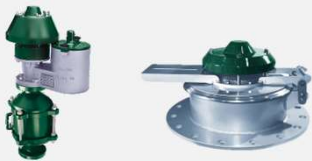
Blanketing & Vapor Recovery



Fisher Tank Blanketing Regulators and Anderson Greenwood Low Pressure Pilot Valve



Emergency Protection



Anderson Greenwood, Enardo & Varec Tank Vents and Flame Arrestors

Liquid Space

Overfill Protection



Rosemount Tank Gauging System

DeltaV SIS

Corrosion Monitoring



Rosemount Permasense Non-Intrusive Corrosion Monitoring

Integrated tank pressure management portfolio

Flame & Detonation Arrestors



Pressure/Vacuum Relief Valves



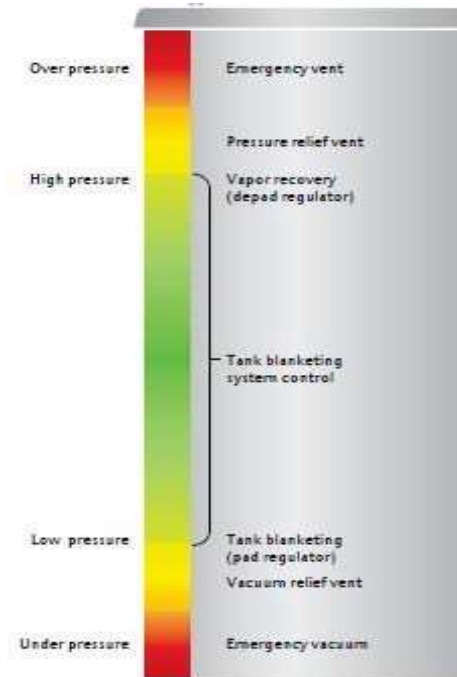
Emergency Vents & Hatches



Blanketing Regulators



Integrated Design



- Complete Range of products for the **Storage tank pressure and safety management.**
- Major Brands for tank products are **Enardo, Varec, Anderson Greenwood and AMAL**

Single Source Supply Allows for an Integrated Design to Reduce Emissions & Operating Cost

Contact Emerson Today to Schedule a Walkdown to Maximize the Reliability of Your Tank Farm

What Is a Tank Walkdown?

Emerson Physical infield review of a customer's existing tank pressure control solution

Review of installation, device physical condition, and attributes (i.e. sizing and materials)

Kick-Off Meeting

Identify tanks to be surveyed, discuss current and past issues, begin pre-work

Field Inventory

Gather information from all accessible tank control devices

Walkdown

Walk each tank, document devices, and review installations

Develop Actions

Review tank information and walk down findings

Final Report

Provide customer with final report with specific actions to be taken

What Is the Objective?

Solve a customer's problem and identify areas of opportunity to improve safety, reliability and reduce cost associated with tank pressure control systems



Reduced Blanketing N2 Costs



Incurring significant N2 costs at one of their facilities in Gulf Coast.

Survey of more than 40 tanks including step-down, pad and de-pad pressure regulators. Improvement opportunities identified on more than 20 tanks.

>\$500,000/year N2 costs savings
Improved performance of tank blanketing regulators with a 40% reduction of vented N2.

TOTAL TANK SOLUTION FOR EMISSION CONTROL



THANK YOU

