

SOLVO INTEG



TECH BRAND OF PLAN B

**SOLVENTS DISPENSE SYSTEMS PROJECTS
SAFETY INTEGRATED SOLVENT MANAGEMENT SOLUTIONS**

PLAN B ENGINEERING SOLUTIONS

**SAFETY INTEGRATED SOLVENT MANAGEMENT SOLUTIONS
SOLVENTS | HANDLING - TRANSFER - DISPENSE | SYSTEMS
For PHARMA SECTOR API & FORMULATIONS INDUSTRIES**

**Head Office : #31A/22, North Phase, 4th Cross Street,
SIDCO Industrial Estate, Ambattur, Chennai - 600 098 www.planbsolutions.in**

PLAN B - COMPLETE PROCESS AUTOMATION SOLUTIONS PROVIDER

Plan B Engineering Solutions - Total Industrial End to End Process Automations Customized Solutions Provider since 2013

To Provide Process Safety Improvement Futuristic Automation Solutions to all Process Industries...

Capabilities and Expertise:

- ✓ ***Raw Materials Dispense Management Solutions*** Powder Chemicals RM's Big Bags and Bags.
- ✓ ***RM Robotic AGV Automations*** Dispensing, Batching, Blending, Check weighing, Bulk bag/IBC
- ✓ ***Material Handling Robotic AGV Automations*** Bagging / Filling / Palletizing Final Products
- ✓ ***Solvents Management Solutions*** Bulk, Drum Solvents and Liquid Chemicals direct to Reactors
- ✓ ***Reactors Solutions*** - (RM Dispense / Temperature Control Management / Batch Automation)
- ✓ ***PLC, SCADA Controls and MES Software*** / Instrumentation / Telemetry / Electrical
- ✓ ***Project Management / Turnkey Contracts*** Networking, Remote Management

WHAT DO WE PROVIDE?

We provide Quality assured proven consulting and engineering services for a wide variety of industries and processes together with our industries best Technical Associated Partners.

We combine multi-disciplinary engineering expertise (mechanical, electrical, electronics, instrumentation, PLCs, SCADA, computers and software) with deep domain knowledge. Modernization of existing plants and automation of specific processes can also be taken up.

This includes Engineering, Documentation, Procurement assistance, Vendor management, Verification of supplies, Quality checks, Standards and Testing compliances, Supervision of erection and commissioning, Integration of vendors and Project management.


By engaging us, clients achieve Process Safety, Cost reduction, Improved quality and Productivity, Timely completion and Safe Production Environment to cater safety of Employees and Equipment.

INDUSTRIES SERVED:

Life Sciences Pharmaceutical – API & Formulations | Inks & Paints | Food & Beverages | Chemical | Petrochemical | Agriculture | Feed and grain | Water/wastewater | Power | Mining and metals | Pulp and paper | General automation

CHRONICLES OF INDUSTRIAL FIRES

Reactor blast at SB Organics in Sangareddy on Wednesday



MAJOR REACTOR BLASTS IN STATE

April 3, 2024: 6 persons died and 14 injured in reactor blast in pharma plant at Sangareddy	Feb 18, 2024: 3 workers injured in reactor blast in chemicals unit in Pashamylaram Industrial Park	October 13, 2023: 15 workers of a pharmaceutical company seriously hurt in a reactor blast in IDA Bollaram
July 17, 2023: 11 injured in reactor explosion in a colour making unit near Shadnagar	June 10, 2023: 3 sustained 90% burn injuries following a chemical reactor explosion in Pashamylaram	March 1, 2023: 2 workers of a pharmaceuticals firm killed due to chemical reactor explosion at Jeedimetia

FACTORIES/ INDUSTRIES FIRES IN STATE	MAJOR REASONS
2023: 260	<ul style="list-style-type: none"> Human error Not enforcing safety equipment
2022: 189	<ul style="list-style-type: none"> Negligence in following fire safety measures Chemical reactions
2021: 200	<ul style="list-style-type: none"> Deploying daily labourers in place of skilled workers for cost-cutting
2020: 271	

1,116 deaths in state due to fire accidents

Courtesy – The Times of India Hyderabad Friday April 5, 2024

OUR SERVICES TOWARDS IMPROVING PROCESS SAFE AUTOMATED PRODUCTION PLANTS

PROCESS SAFETY ISSUES: *Unsafe Incidents, near miss due to Manual Movements, Unsafe Handling Dispensing Operations of Solvents (Fresh / Used) in Process Plants of Pharma, Chemicals Production units.*

PROCESS SAFETY SOLUTIONS: *Improving Process safety in Production Plants by Maximum Elimination of Liquid Solvents UGT / Drums Manual movements with Customized Cost effective, Process Safe, user friendly Automation Solutions to create safer working System for Employees, Equipment, & Productive Safer Environment!*

FUTURISTIC MODEL POWDER / LIQUID RAW MATERIALS DISPENSE SOLUTIONS

- Using AGV & ROBOTS mobilization

*Applicable for Production Units which has more different
types of Powder and Liquid Chemicals Raw materials to be
handled from Stores to Production.*



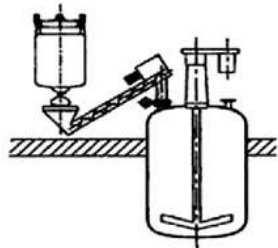
Our Solutions will Avoid Complete Unsafe Dispense of Powder Bags, Big bags Operations in Plant & Improves Process Safety.

RAW MATERIALS DISPENSE SOLUTIONS TO REACTORS USING AGV ROBOTICS

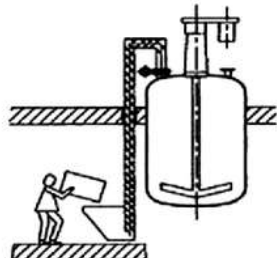
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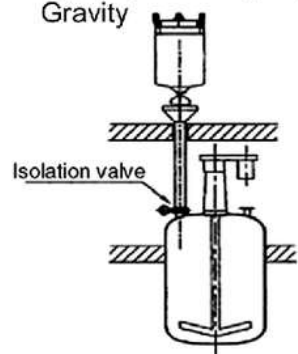
2. Screw Conveyor



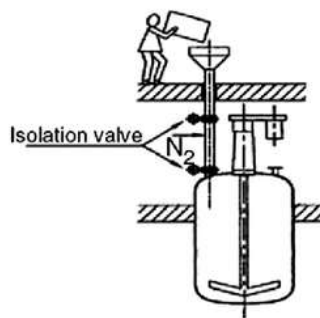
3. Elevator



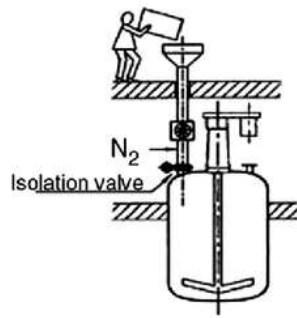
4. Big-Bag Discharge by Gravity



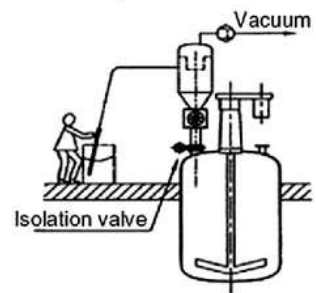
5. Sluice



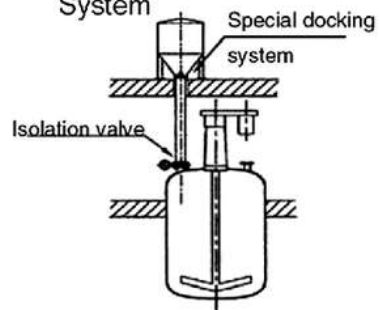
6. Rotary Valve



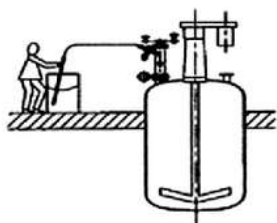
7. Suction System with Rotary Valve



8. Container Docking System



9. PTS System





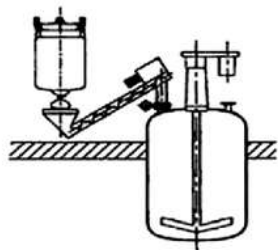
Our Solutions will Avoid Complete Unsafe Solvent Dispense of Drums / Bulk UGT Solvents Operations in Plant & Improves Process Safety.

RAW MATERIALS DISPENSE SOLUTIONS TO REACTORS USING AGV ROBOTICS

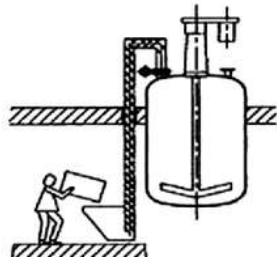
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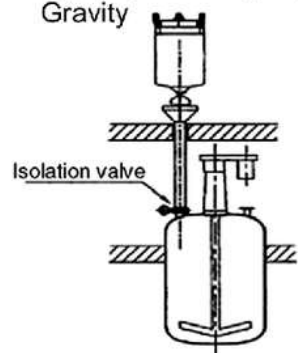
2. Screw Conveyor



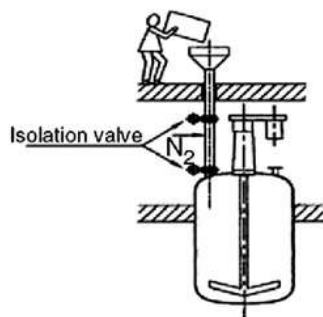
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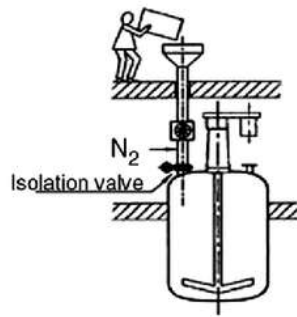
4. Big-Bag Discharge by Gravity



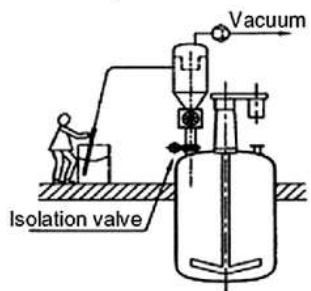
5. Sluice



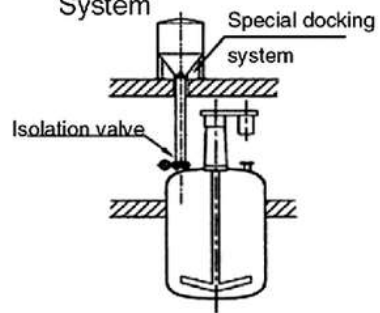
6. Rotary Valve



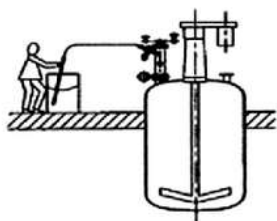
7. Suction System with Rotary Valve



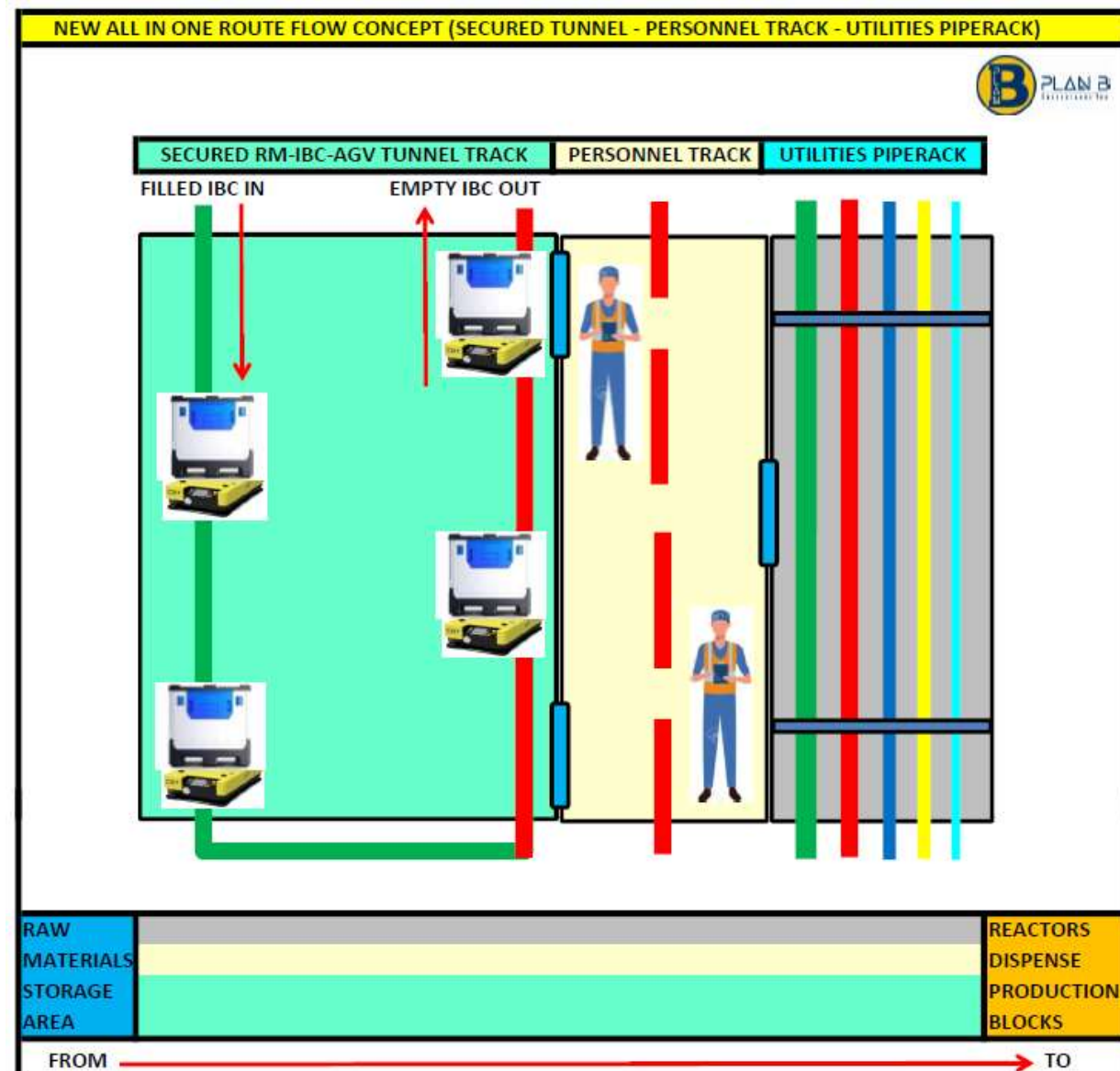
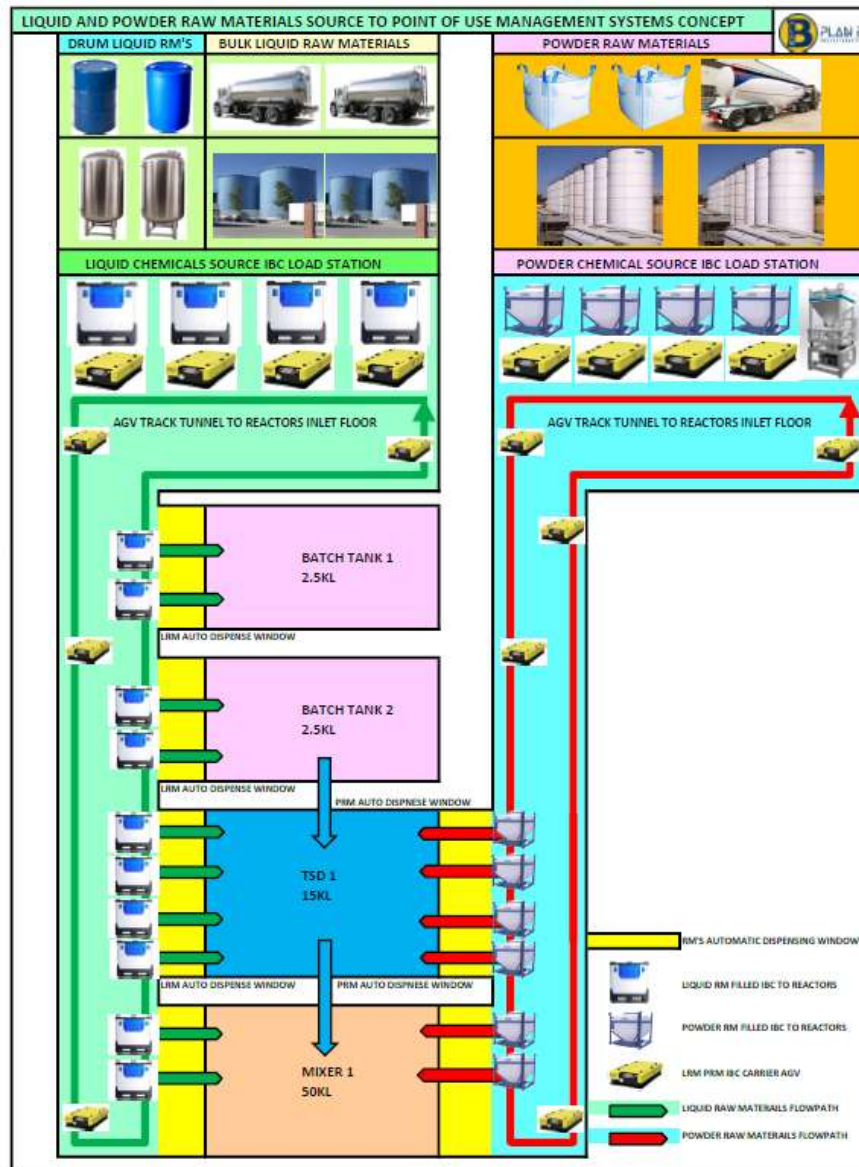
8. Container Docking System

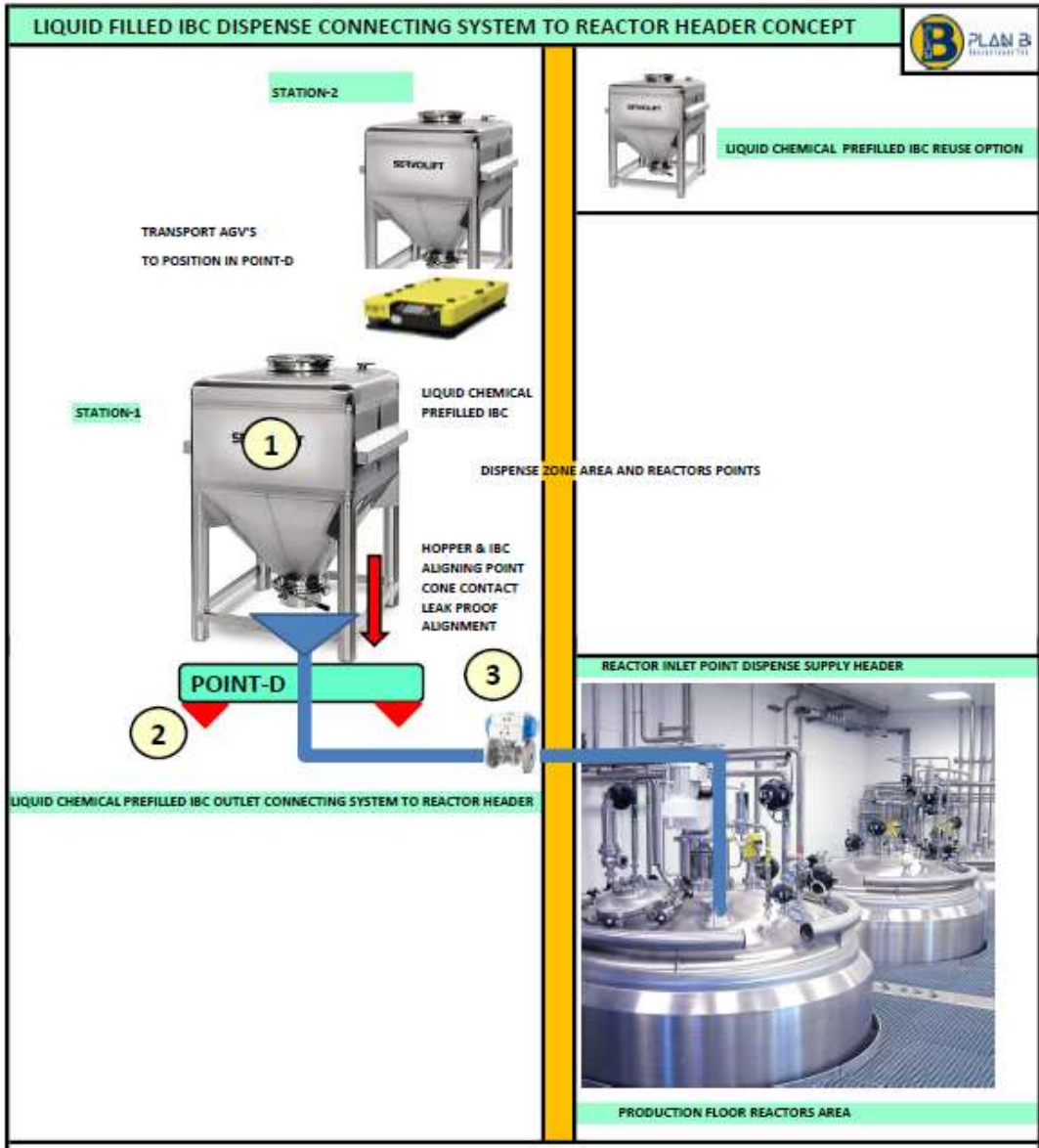


9. PTS System



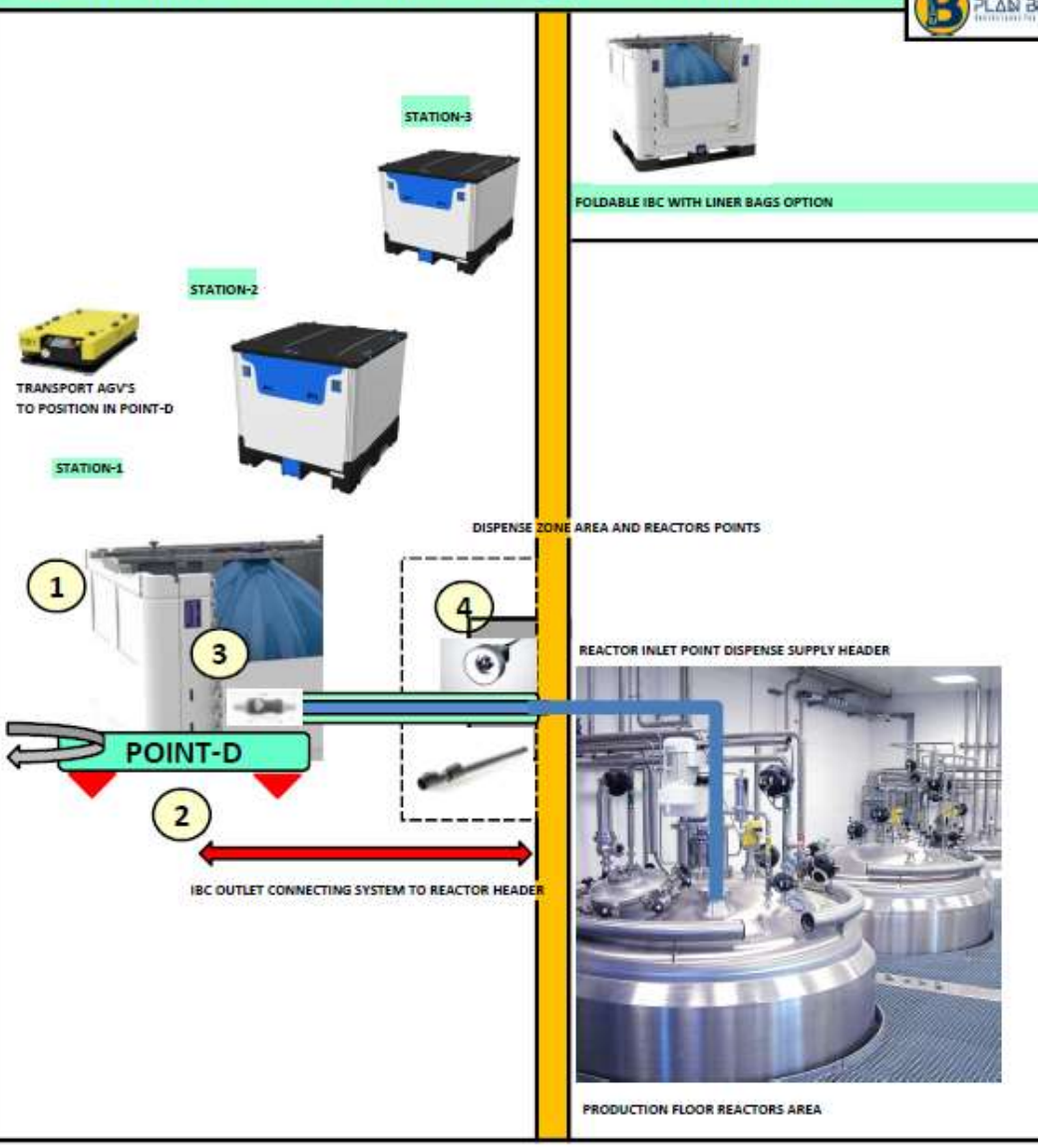
RAW MATERIALS DISPENSE SOLUTIONS TO REACTORS USING AGV ROBOTICS





- 1 Liquid Chemical Prefilled IBC:** Prefilled at required capacity (1KL) and sent via AGV's to POINT-D to Dispense Dedicated Containers for Dedicated Liquid Chemicals. Fill, transport, Dispense and refill and reuse. CIP after Single use optional with customer.
 - POINT-D IBC Weigh Scale Final Dispense Point with Precise aligning mechanism platform.**
Dispense Point provided in every Reactor Inlet area with Weighing Scale for precise Dispense and Self aligning mechanism cone contact of bottom of IBC with Reactor Header Leak proof alignment mechanism.
 - IBC OUTLET CONNECTING SYSTEM TO REACTOR HEADER**
Common Reactor Header Inlet line connected with our IBC's Dispense Point System
This ensures seamless connectivity of two different systems when properly positioned at points and gets connected when needed to dispense liquid out to reactors and return to original positions after the dispense operations.
- FLOWRATE & ACCURACY:-**
Options for Dispense from IBC to Reactors
- 1 By Gravity - The time taken to dispense out full empty of IBC depends on the liquid chemical properties. If dispensed out with proper vent provisions. IBC outlet is 2 inches and generally it takes 3 to 5 mins for water accordingly.
 - 2 By Vacuum or N2 Pressurized dispense out Options can be tried on acceptance Sop of customer
Flow rate can be adjusted by the Header automated inlet valve
- Accuracy of IBC to be emptied
Accuracy : 0.05% of rated capacity - Weighing Industry standard accuracy achievable
- NOTE:**
This is preliminary design for Auto Dispense Connecting points concept. With detailed area's requirements in terms of Number of batches, dispenses per day and flow rate required, systems can be design with many options and automation levels.

FOLDABLE IBC LINER BAGS DISPENSE CONNECTING SYSTEM TO REACTOR HEADER CONCEPT



1 **Foldable IBC with liner bags.** Liquid Chemicals prefilled at required capacity (1KL) and sent via AGV's to POINT-D to Dispense

2 **POINT-D IBC Weigh Scale Final Dispense Point with Precise aligning mechanism platform.**
Dispense Point provided in every Reactor Inlet area with Weighing Scale for precise Dispense and Self aligning mechanism for outlet point positioned towards Reactor Inlet pipe extension header.

3 **Automatic attachable & detachable quick connect no spill MoC compatible latches at IBC outlet point.**
One end fitted in IBC's outlet valve and the other in Reactor Header supply extension line.



4 **IBC OUTLET CONNECTING SYSTEM TO REACTOR HEADER**
Common Reactor Header Inlet line connected with our IBC's Dispense Point System
It has Telescopic Pipe out system with 2 layers covered lines to ensure connectivity and secured dispense
It has machine vision camera to identify the mouth of IBC Outlet Valve point and guides the Telescopic piping system to extend and align with IBC outlet point via quick connectors auto latch systems.
This ensures seamless connectivity of two different systems when properly positioned at points and gets connected when needed to dispense liquid out to reactors and return to original positions after the dispense operations.



Machine Vision Camera position over the extension pipe



Telescopic pipe extension setup

FLOWRATE & ACCURACY:-

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CONVENTIONAL METHOD LIQUID CHEMICALS / SOLVENTS RAW MATERIALS DISPENSE SOLUTIONS

Automated Process Safe Dispense Solutions for Drum and Under Ground Tank Solvents direct into Reactors

CHEMICAL DISPENSING MODULE –

Safe, Simple, Automated, cost effective Chemical Handling, Transfer and Dispense system. Can **Dispense Solvents, High Purity Chemicals, Acids and Process Liquids from Drums, Carboy, and IBC from Storage Area to Point of Use** in Production Floor with precise weight Dispense.

CDM Benefits

- Safe Dispensing minimizing Chemical Exposure
- Promotes Employee and Environmental Safety
- Reducing manual Intervention and Cross Contamination
- Increased productivity in adhering process safety Industries SOP

Features

- Auto / Manual Pumps Control Panel for Selection
- SS Weighing Controller panel for Dispensing Controls
- Coarse fine Filling head Auto Valves for dispense
- Integrated Weigh Scale ensures dispensing Accuracy
- Solvent Compatible MOC Pneumatic pumps and Valves
- Manual Draining and Flushing functions for Maintenance

Application: Pharma API, Formulations, Food, Chemicals & Paints

Safety concerns faced during hazardous Chemical Handling



ELECTROSTATIC HAZARD CONTROL & MONITORING AT API MANUFACTURING

Static Control for Hazardous Area

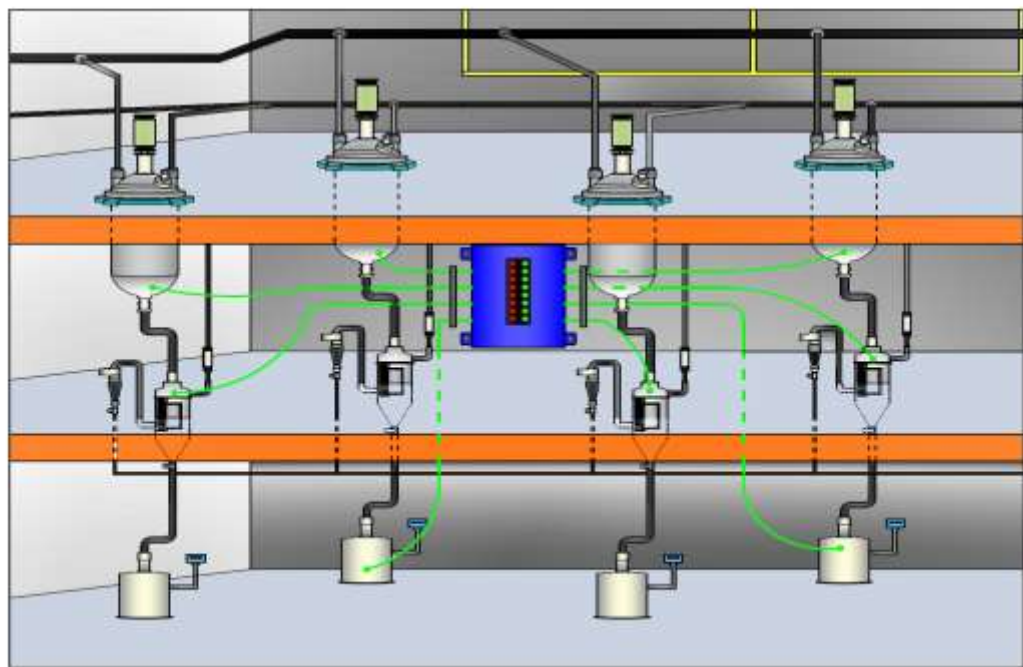
Electrostatic Hazard Control & Monitoring at API Manufacturing

In process industry, solvents of low Minimum Ignition Energy and powders are processes at plant site in various metallic plant equipments. These metallic plant equipments like, reactor, vessels, pipe lines, pumps, centrifuge etc. These plant equipments are often operated in flammable atmosphere.

This plant may have insulated gasket between them and can isolate that

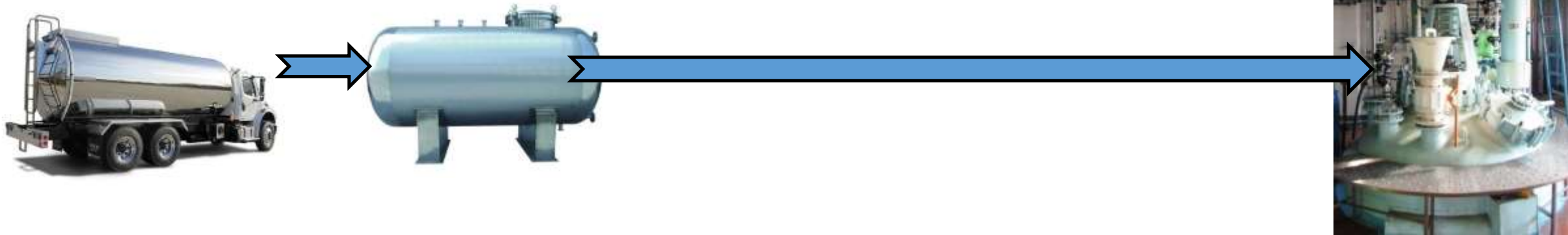
part from main earth. Even in regular maintenance practice it is time consuming to ensure proper dissipation path. However, many responsible organizations prefer online monitoring system.

It is also stated in IS7689 and NFPA 77 that all conductive plant equipment used in hazardous area must have resistance to earth path less than 10 Ohm all the time.



**TO AVOID UNSAFE INCIDENTS IN PROCESS PLANTS
Electrostatic Discharge Safety Protection with
Continuous Monitoring System**

SOLUTION-1: SOLVENT MANAGEMENT SOLUTIONS IN API BULK UGT Solvents direct Dispense into Reactors Dispense System



- *Process Safe UGT (Under Ground Tank) Solvents Management Automated System Distance Dispense.*
- *Coverage from Unloading UGT storage area to Process Safe Direct Dispensing into Reactors. Or UGT to Day tanks and Dispense Direct to Reactors Options.*
- *Multi UGT Underground Tank Solvents to Direct to Reactors.*
- *Suitable for Pharma API and other Bulk Manufacturing Process Industries which gets Solvents in Tankers and stored in Storage area Under Ground Tanks UGT, need to Dispense Direct into Production Floor Reactors in required Batch.*

UNDER GROUND TANKS – BULK SOLVENTS TO PRODUCTION BLOCK REACTORS DIRECT DISPENSE

-BULK MOBILE CONTAINER TRUCK to UNDER GROUND TANK Bulk Storage (via Gravity or Pump Unloading)

Existing Methods – From UGT Pumps to Drumming Station in Stores and Drums moved into Production Blocks Reactor Area and Vacuum pumped into Reactors. Precise dispense to be ensured. More manual handling and errors possible. Risk of unsafe incidents due to manual Handling expected.

DAYTANKS STORAGE OPTIONS – Existing SYSTEMS commonly used

-UNDER GROUND TANKS to PRODUCTION BLOCK DAY TANKS(Optional)

Day tanks at Ground Floor adjacent to Production Block or on top floor Day Tanks Storage for bulk Solvents

-PRODUCTION BLOCK DAY TANKS to REACTORS DIRECT DISPENSE (via Gravity or Pump Dispense)

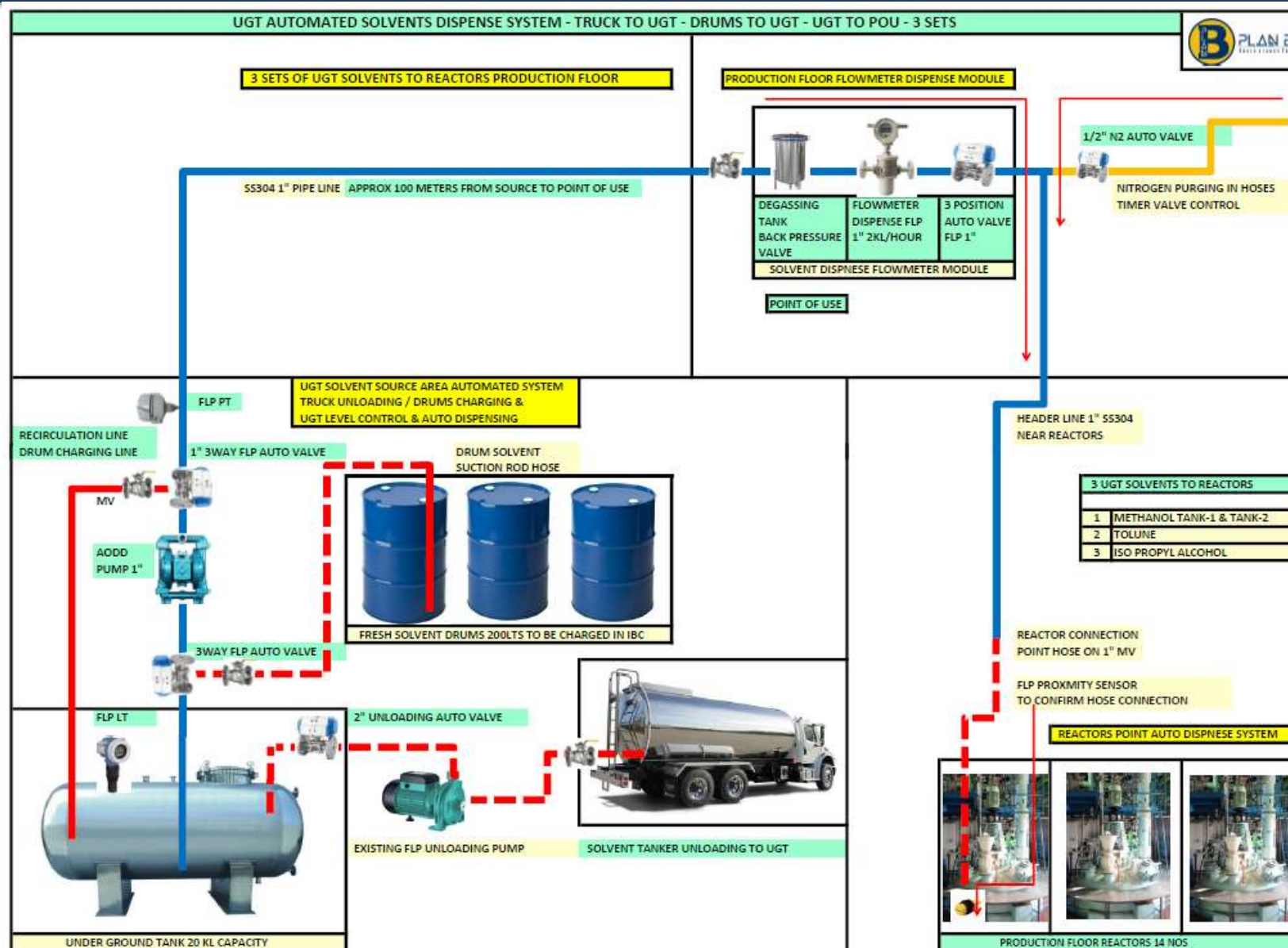
Separate Control Automation for precise Dispense and Direct Dispense to Reactors to be done.

ALL IN ONE SYSTEM OPTION

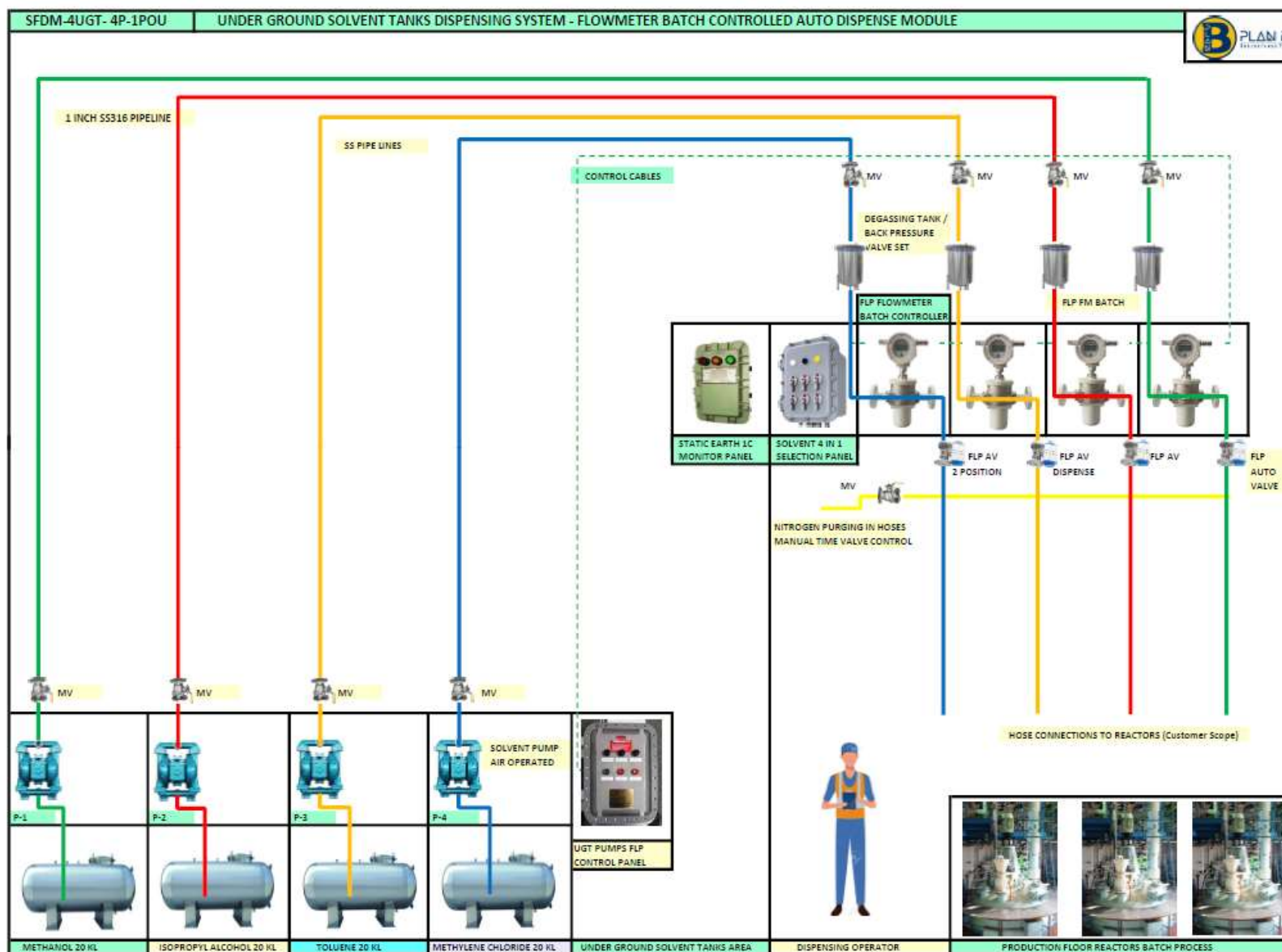
UNLOADING TRUCKS to UNDER GROUND TANKS to DIRECT REACTORS DISPENSE as ONE SYSTEM

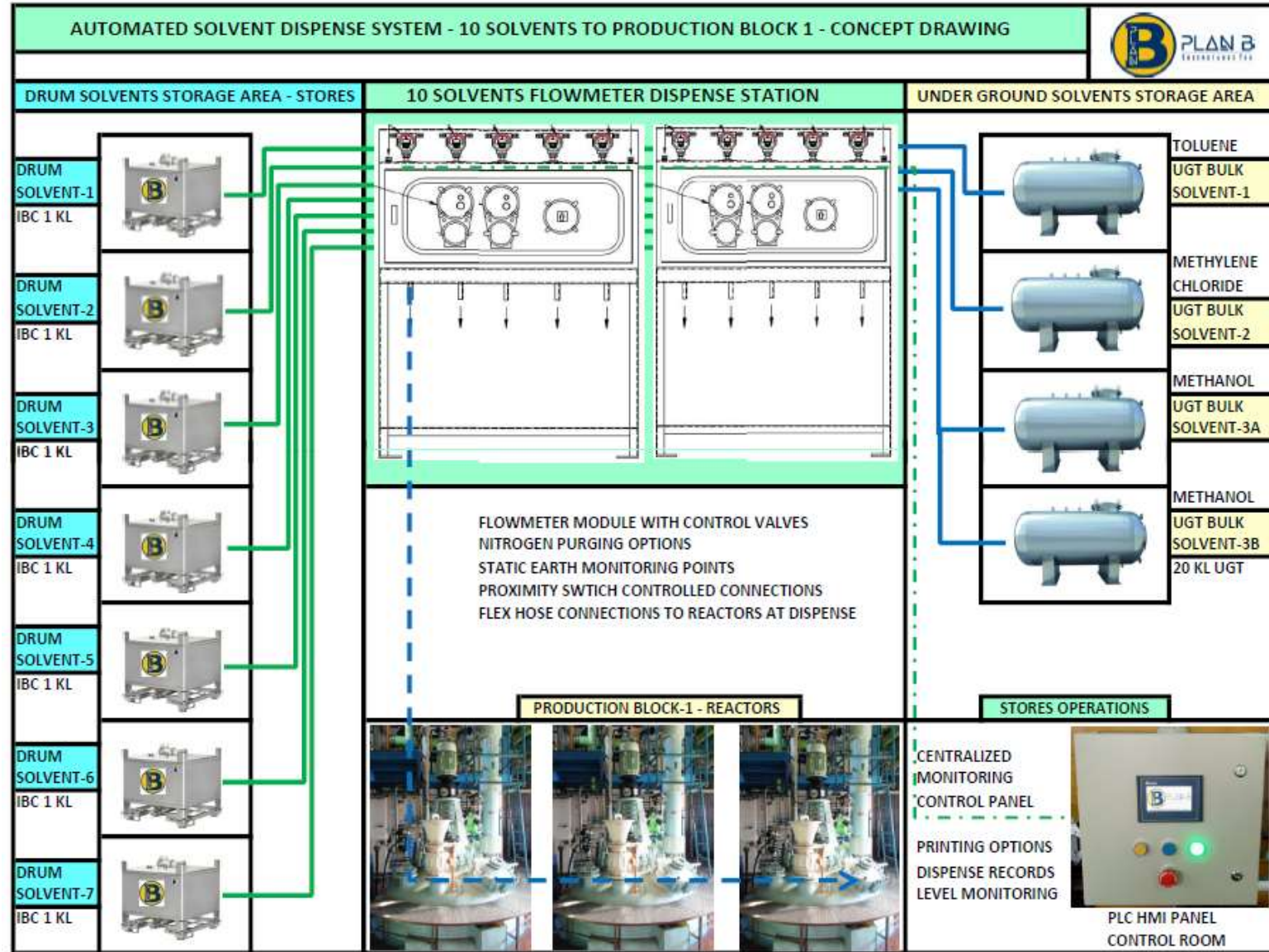
(via Flow meter Module setup in Production floors) – No need of Day tanks or Another Storage in Production area. All UGT Solvents made available to the Production floor Reactors when and how much needed at the time of Reactors Operations. Pumping System with Piping Controls from UGT Area to Reactors area via Flow meter Module. End to End closed loop automation minimizes Cross Contamination, Manual Errors, manual Interventions and improves Productivity.

SOLVENT DISPENSE SOLUTIONS – UGT SOLVENTS TO REACTORS OVERVIEW

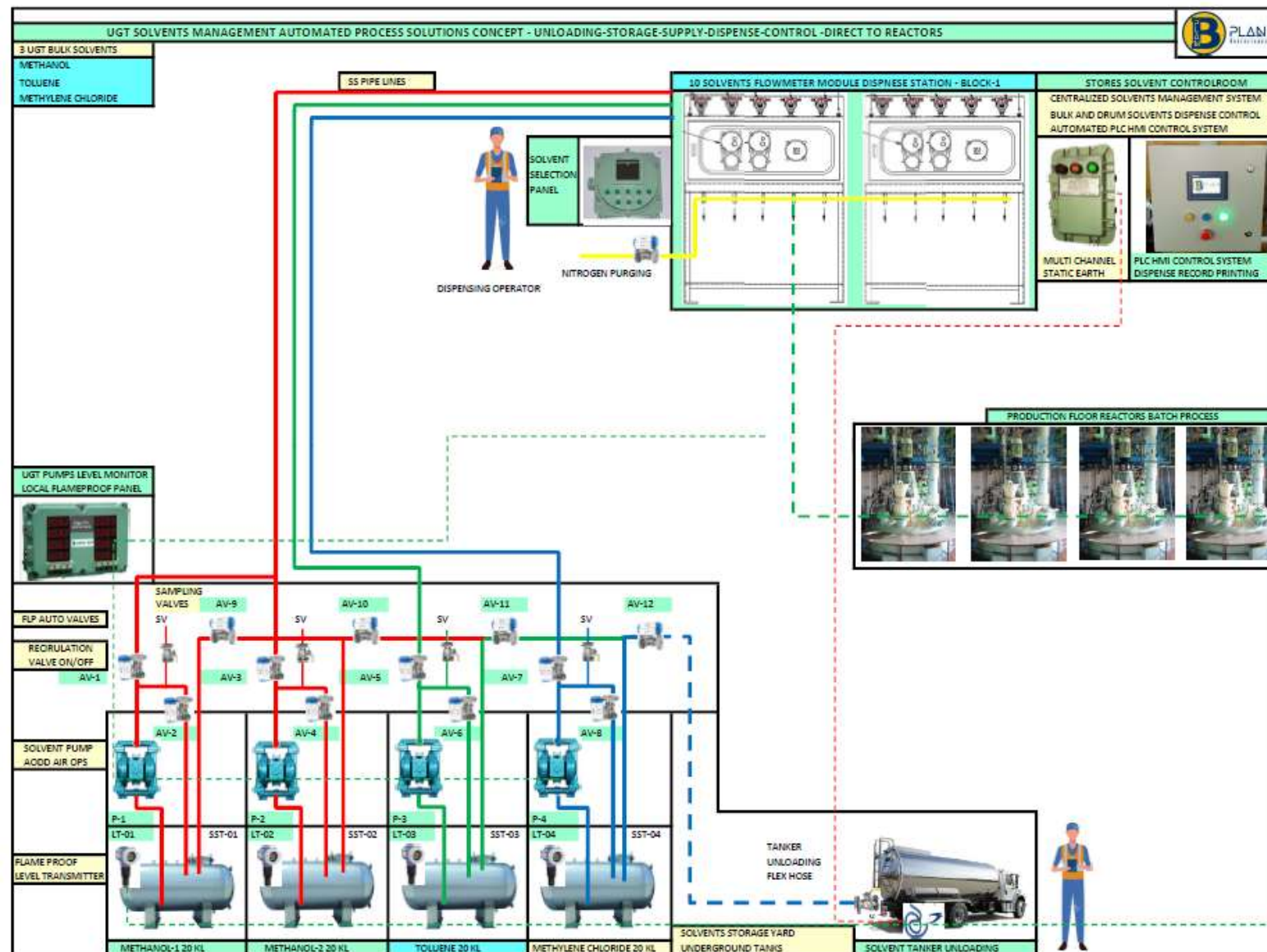


SOLVENT DISPENSE SOLUTIONS – UGT SOLVENTS TO REACTORS OVERVIEW

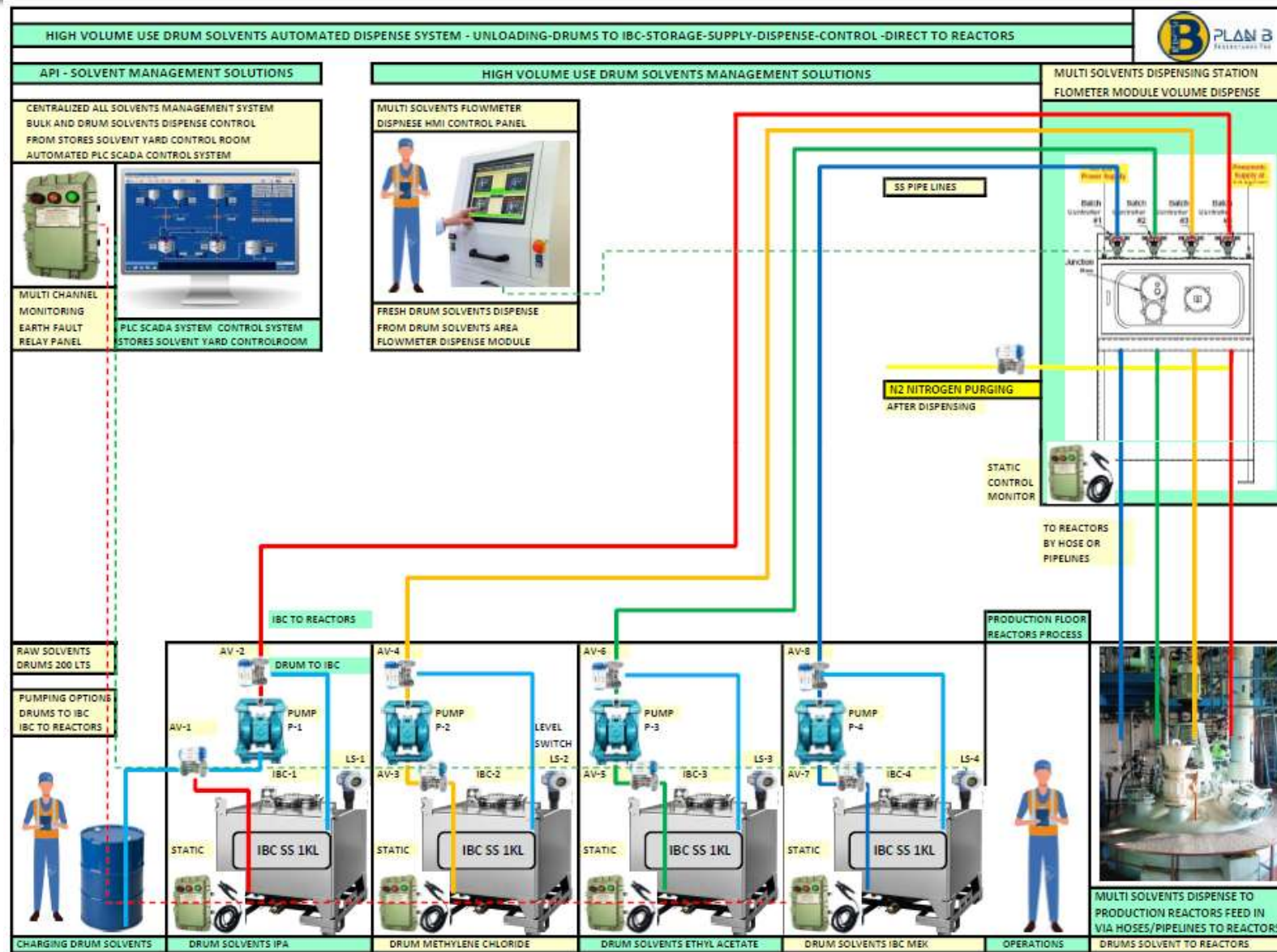




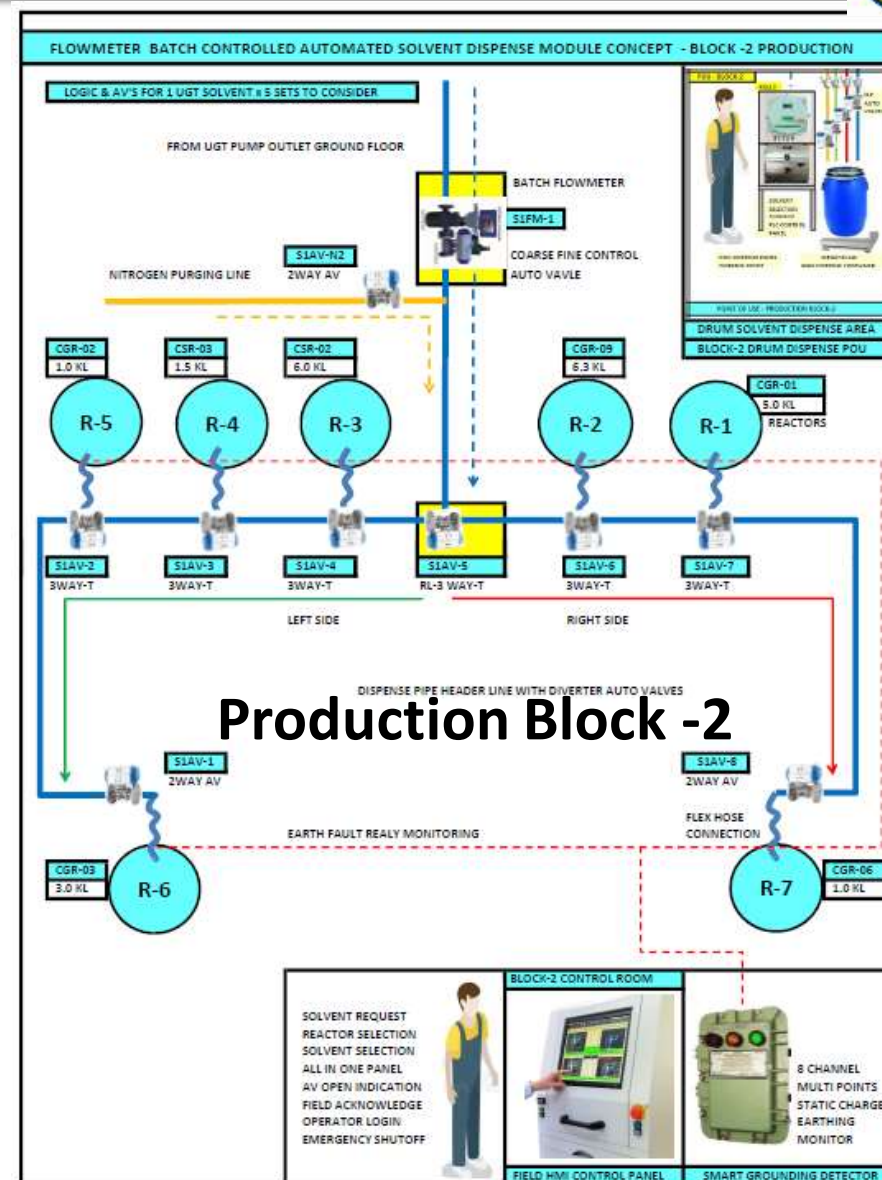
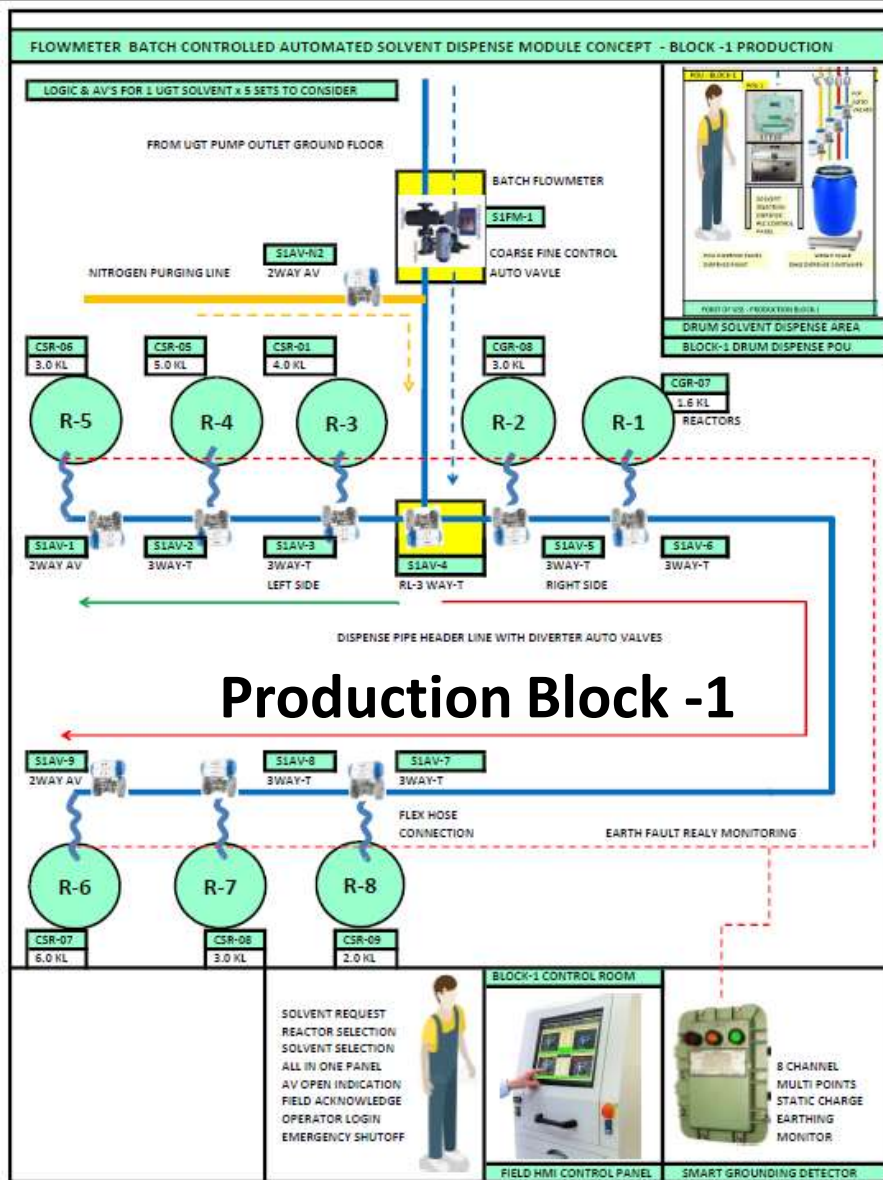
SOLVENT DISPENSE SOLUTIONS – UGT SOLVENTS TO REACTORS OVERVIEW



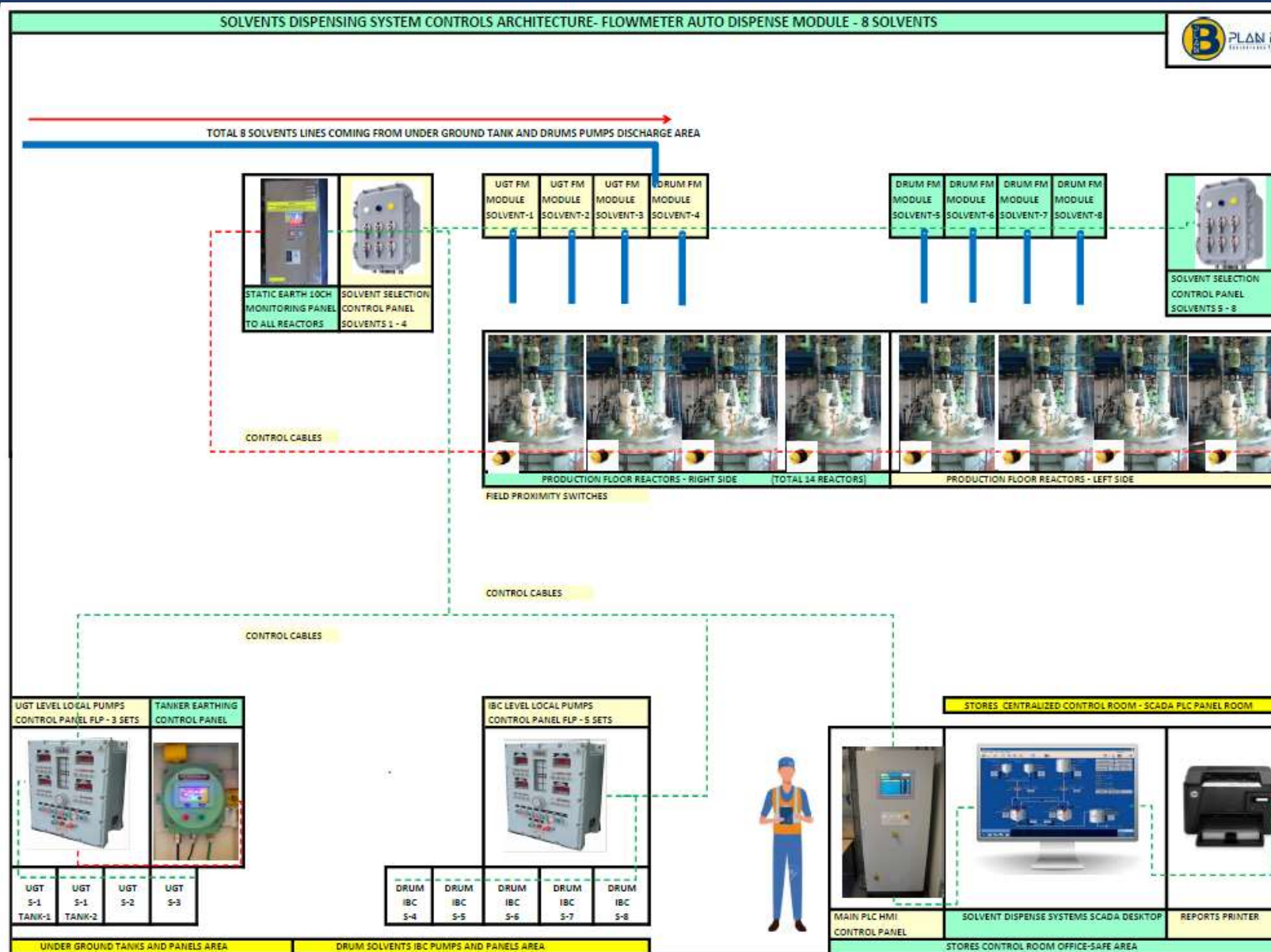
SOLVENT DISPENSE MODULE – DRUMS TO FLOOR REACTORS – AUTOMATED



SOLVENTS AUTOMATED SUPPLY TO REACTORS IN PRODUCTION FLOOR

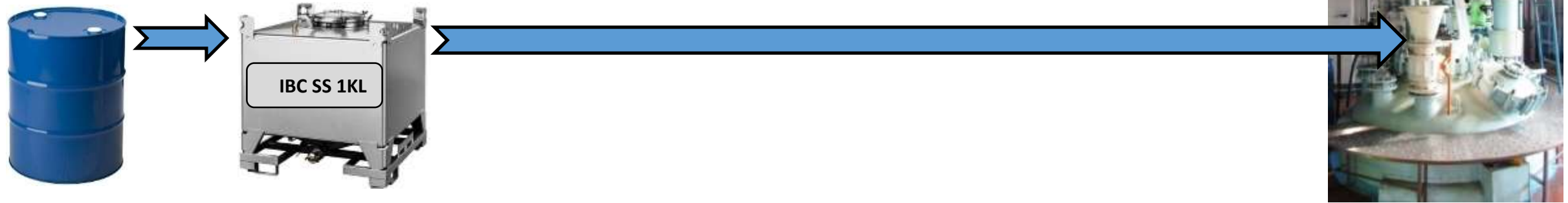


SOLVENT SUPPLY TO REACTORS CONTROL AUTOMATION CONCEPT



- *Our Solutions cover EHS, Process Safety, SOP, Operations, Maintenance, QC - easy manage.*
- *All Components and Process Solutions Designed as per SOP and Standard Zone Safety Compliance regulatory guidelines.*
- *Air Operated Pumps with no Power needed to run in Hazard drum storage area*
- *Flame proof Control Valves and Level Transmitters at UGT Tank Level monitoring*
- *Zone Specific Compliance Control Components used in total Projects*
- *Solvent Compatible MOC Pneumatic pumps, Valves, Flow meter & Level Sensors, Piping and fittings used for total wetted parts quality safe transfer system design.*
- *Earth Fault Relay to ground Static Charges in Solvents line at Pump area & POU's On all reactors with Operating Interlock and Indication Panels.*
- *Solvent Selection Interlock allows only one Solvent Selected and others disabled when dispensing at any floor.*
- *Direct to Reactor ensured by Diverter Valves directed header line to that Selected Reactor and stays open till the Dispense Complete and N2 Purging.*
- *Manual Draining and Flushing functions for Maintenance with easy interlocks.*
- *Full Manual Operation possible when Emergency on Auto Functions Failure.*

SOLUTION-2: SOLVENT MANAGEMENT SOLUTIONS in API BULK **Drum Solvents direct into Reactors Dispense System**



- *Process Safe Drums Management Automated System Distance Dispense.*
- *Multi types of Solvents Drums to be Dispensed in required quantities Direct to Reactors in Batch Production.*
- *Suitable for Pharma API and other Bulk Manufacturing Process Industries which gets Chemical in Drums stored in Storage area and need to Dispense Direct into Production Floor Reactors in required volumes of Batch.*
- *Coverage from Stores Solvent Drums Storage area to Direct Dispensing into Reactors.*

DRUMS SOLVENTS TO PRODUCTION BLOCK REACTORS DIRECT DISPENSE

-DRUM SOLVENTS IN SOLVENT STORAGE AREA STORES

For Production use of Drum Solvents Storage – Multiple Solvent drums in Stores

NO MOVEMENT OF SOLVENTS DRUMS IN PLANTS – DRUMS STAYS IN STORES ONLY.

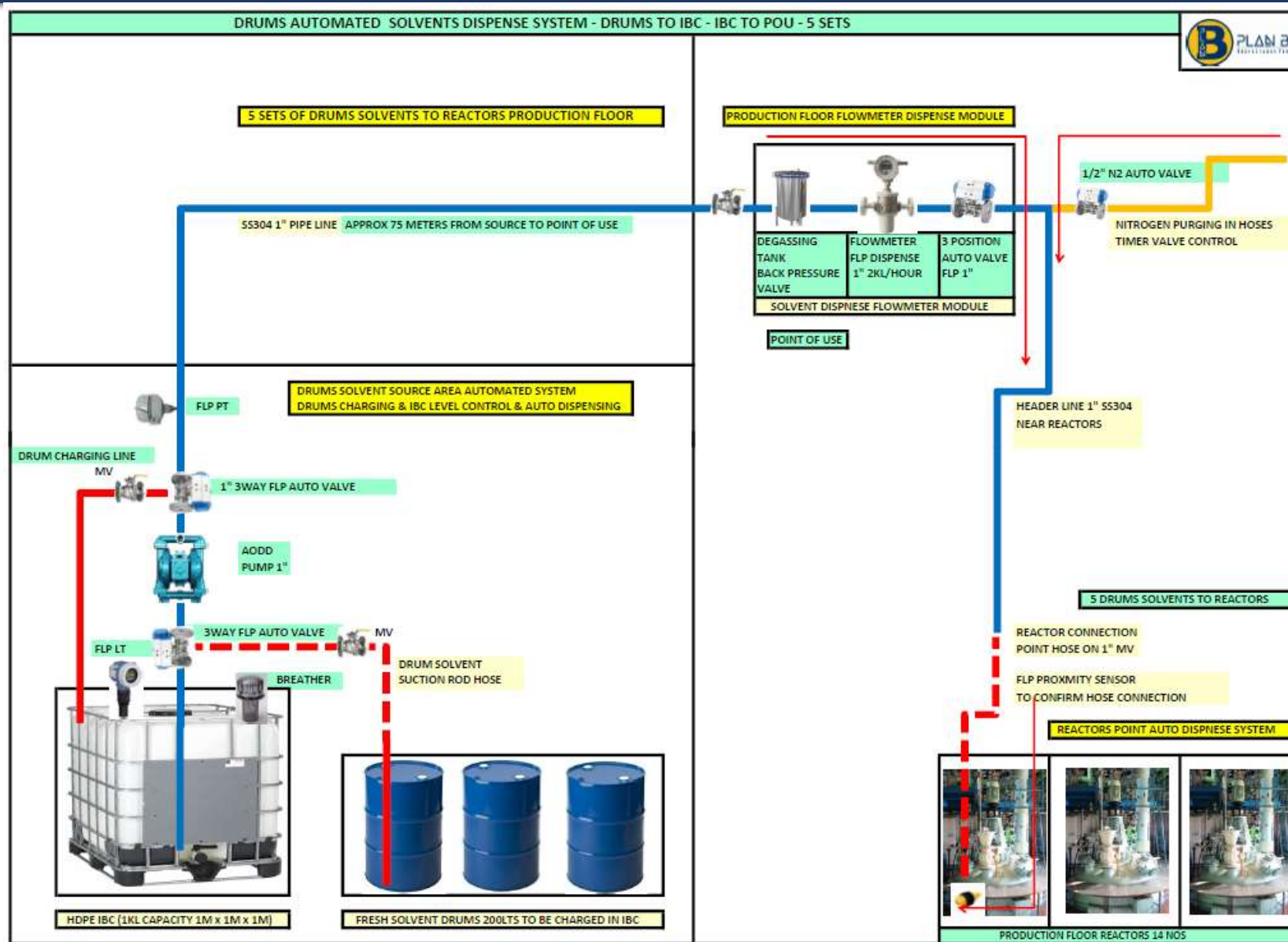
OPTION-1 DRUMS SOLVENTS(BULK VOLUME USE) TO DIRECT REACTORS DISPENSE

Solvent Dispense Module Pump Setup set in Stores Area. Dedicated pipelines with Flow meters Module Control Automation for precise quantity and Direct Dispense to Reactors as and when required. Drums to IBC intermediate storage in Stores and direct to Reactors Pumping Process. Multiple Drum Solvents made available safely in Production floor for Reactors.

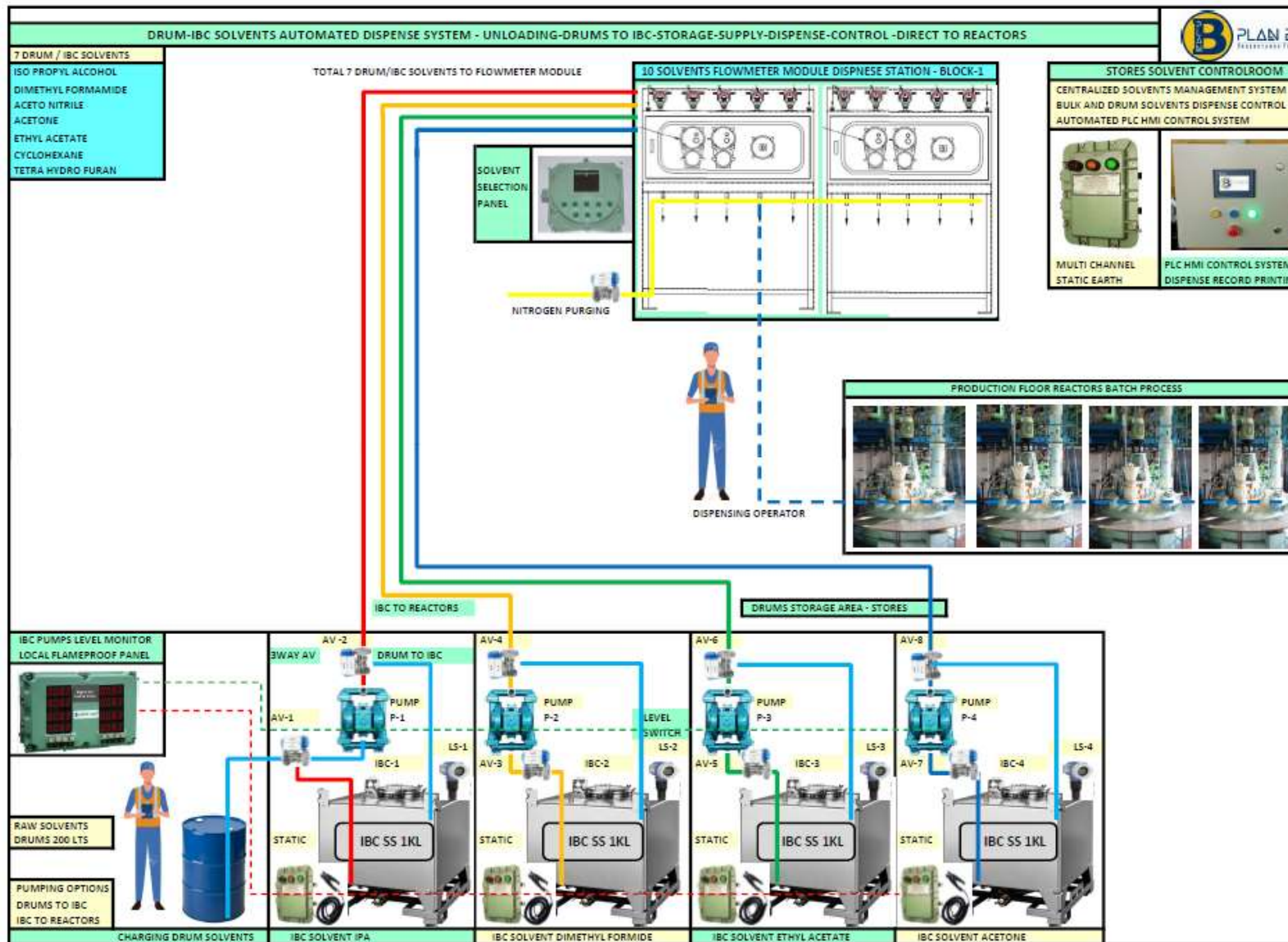
OPTION-2 DRUMS SOLVENTS(MINIMUM VOLUME USE) TO REACTORS POINT OF USE AREA

Solvent Dispense Module Pump Setup set in Stores Area. With dedicated pipelines with Weighing Scale Module of Various Solvents in One Point with Control Automation for precise quantity. Drums to IBC intermediate storage in Stores and direct to Point of Use in Reactors Area. Multiple Drum Solvents made available safely in Production floor for Reactors.(Dispense in Small Container and use accordingly in reactors feed when needed.

SOLVENT DISPENSE SOLUTIONS – DRUMS SOLVENTS TO REACTORS OVERVIEW

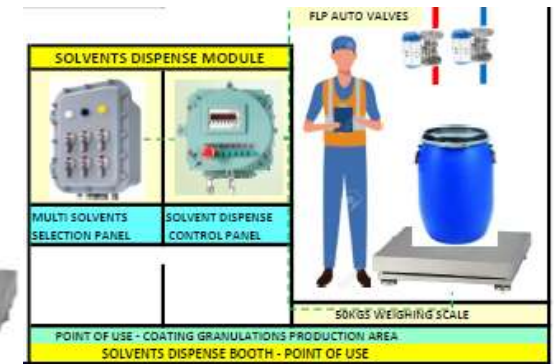


SOLVENT DISPENSE SOLUTIONS – DRUMS SOLVENTS TO REACTORS OVERVIEW



BENEFITS	HIGHLIGHTS
✓ Can completely avoid drums or containers movements in Plant	✓ Complete Process Safety Operations for flammable Solvents Handling in Plant
✓ Can completely avoid cross contamination of Solvents Operations	✓ Weight Based Dispensing and Flow meter based precise dispensing systems available on Operations based requirements.
✓ No Manual Handling / Manual Transfer anymore	✓ Eliminates labor usage for this process daily to shift Solvents from Stores to Production floors via Drums or carboys etc.,
✓ Reduce Evaporation loss in stores and Operations area	✓ Resulting labor cost savings to management
✓ Manual Activities eliminated to large extent	✓ Ensures Employee, Environment and Equipment Process Safety.
✓ Completely avoid Manual handling errors in Operations	✓ Cost effective and user friendly system
✓ Increase in Productivity and improvement in Zone Safety	✓ Widely used by Pharma API & Formulations Manufacturing Plants.
✓ Increase and stability in Process Safety in Storage and Operations area	✓ Available in SAFE & FLP Zone Models.
✓ Flameproof Systems for Solvents dispensing controls	✓ Expandable POU's for Extra Solvents & Extra Dispensing Points
✓ Static Earth Safety ensured in all areas of Solvent Handling	✓ Multi Channel Static Earth Monitored Systems with Operations interlock Safety

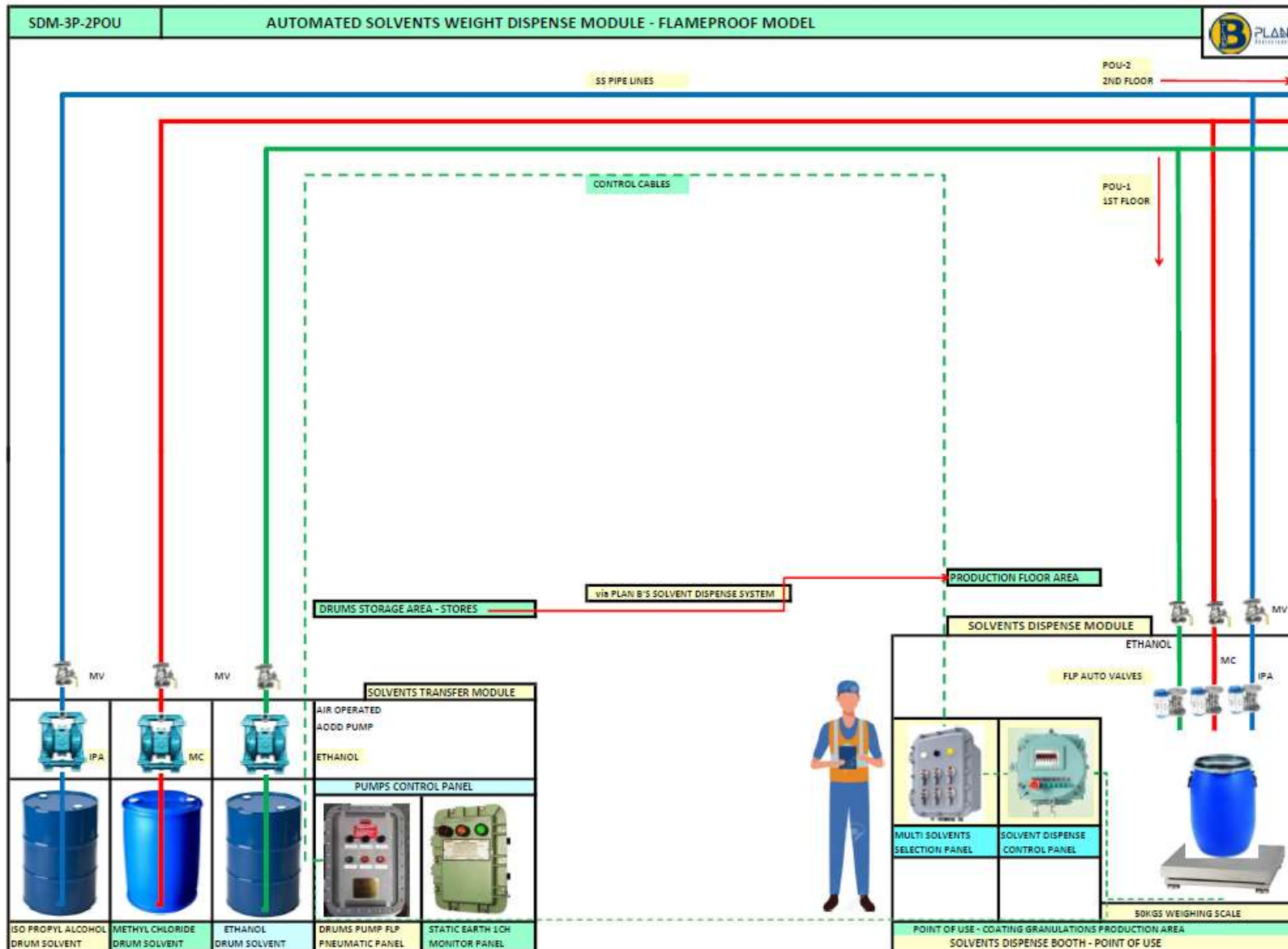
SOLUTION-3 (SDM) MULTI SOLVENTS DISPENSE MODULE (Can be considered for Low Volume liquid RM's feed into Reactors)



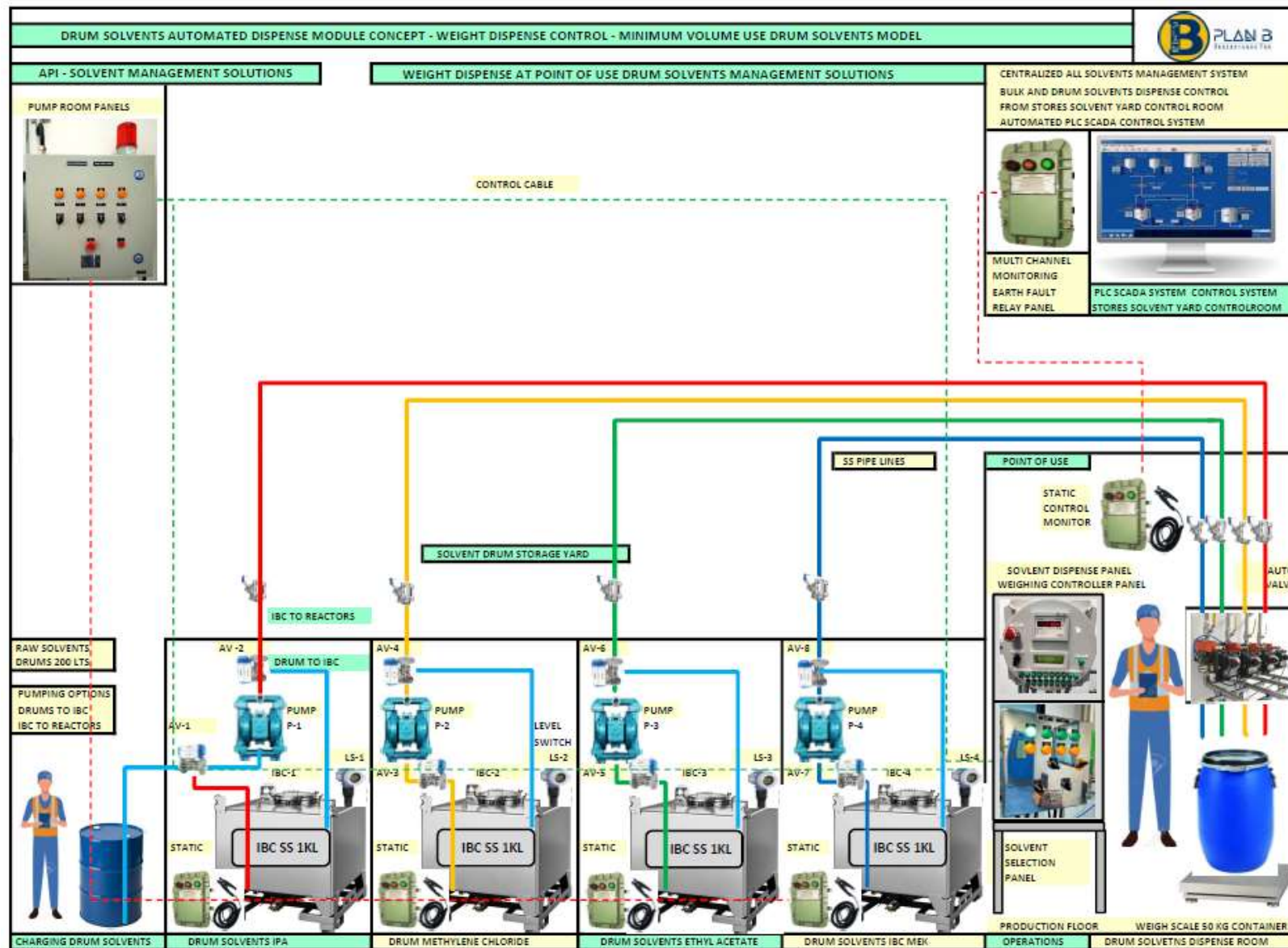
Drums to Point Of Use distance Dispense in Production area

- *Solvent Dispense Module – Multi Solvents Drums to Small Containers in One Point of Use in batch Production.*
- *Suitable for Pharma Formulations and other Process Industries which gets Chemical in Drums, stored in Storage area and need to Dispense in Production Floor usage in required volumes.*

SOLVENT DISPENSE MODULE – DRUMS TO POU DISPENSE POINT AUTOMATION



SOLVENT DISPENSE MODULE – DRUMS TO POU DISPENSE POINT AUTOMATION



SOLUTIONS / CONSULTATIONS PROVIDED TO CUSTOMERS



Aeon Formulations Pvt Ltd



Tristar Formulations Pvt Ltd



BAFNA PHARMACEUTICALS LIMITED



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