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AN ENGINEERING-LED GUIDE

THE IBC STORAGE AUTOMATION GUIDE

FOR CHEMICAL WAREHOUSES

How to increase capacity, cut forklift movement and gain real control - without rushing into the wrong decision.

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INTRODUCTION

Walk into most chemical warehouses that store IBCs, and you'll see the same story playing out at a different stage.

Intermediate Bulk Containers are the backbone of how chemical operators store and move liquids and semi-liquids. Robust, practical, everywhere. Nobody questions using them.

What gets questioned, eventually, is whether the warehouse around them still works.

Volumes grow. The product range expands. Space that once felt generous starts to feel tight. And a storage area that used to run itself quietly becomes the thing everyone on site has an opinion about.

You'll recognise the symptoms even if you haven't named the problem yet:

- More IBCs than the floor space comfortably holds
- A creeping reliance on overflow or external storage
- Forklifts crossing paths more than they should
- Time lost hunting for the right IBC at the right moment
- A rising sense of one bad movement from real damage
- Someone, somewhere, asking about extending the building
- Segregation and access rules getting harder to hold
- Batch and location data that nobody fully trusts

None of this is a sign you're doing it wrong. It's a sign the operation has outgrown the storage design it started with.

> The real question isn't "how do we fit more IBCs in." It's "what would a storage system built for how we actually operate today look like."

This guide exists to help you answer that properly, before you spend a pound on space, labour or equipment - the same thinking an engineer would walk you through in a feasibility review.

01 WHY IBC STORAGE BECOMES THE BOTTLENECK

It rarely happens overnight. It happens one small compromise at a time.

A handful of IBCs end up in a temporary spot because there's nowhere better. A forklift route gets a little tighter. Someone spends ten extra minutes finding a batch that should have taken two. None of it looks urgent on its own.

Then one day it's the whole operation.

- **Growth in product range.** More SKUs, more variants, more specialist materials, each adding its own storage and access logic.
- **Higher stockholding.** Supply disruption, customer pressure or production planning push more material onto the floor than the layout was ever designed to hold.
- **Wasted footprint.** Floor storage and wide aisles feel flexible, but rarely deliver density. Most sites store far below what their footprint could support.
- **Unused height.** The floor is full. The air above it usually isn't.
- **Forklift dependency.** Every movement someone makes by hand is a movement that can go wrong, take too long, or block someone else.
- **Access logic that doesn't match reality.** If the layout wasn't designed around how IBCs are actually used, operators work around it rather than with it.
- **Weak inventory visibility.** When product, batch and location data aren't tightly controlled, the system runs on memory and habit. That doesn't scale.
- **Hazardous material constraints.** Segregation, spill control, fire access and hazardous-area classification add complexity that generic storage thinking ignores.

The warehouse can look completely full and still not be working nearly as hard as it could.

02 THE COST YOU'RE NOT PUTTING A NUMBER ON

The space problem is the visible one. It's rarely the expensive one.

- **External and overflow storage.** It solves today's pressure and quietly adds transport, handling, admin and a second location to keep track of. The operation gets less responsive, not more.
- **Movements that shouldn't need to happen.** Every IBC you move just to reach the one behind it costs time, costs equipment capacity, and adds a chance for something to go wrong.
- **Slower everything downstream.** Production support, dispatch, replenishment, stock rotation - a poor layout costs everyone waiting on the warehouse team.
- **Higher damage risk.** IBCs are built to take punishment, but repeated handling in a congested space is exactly how spills and impact damage happen.
- **Control that lives in people's heads.** If your best operator is the only one who really knows where everything is, you don't have a system. You have a dependency.

THE EXPANSION ASSUMPTION

This is the one that costs the most, and it's the one worth challenging hardest: the assumption that the only answer to "we're full" is a bigger building. Sometimes it is the answer. Often it isn't, and nobody checked before signing off the capital.

03 THE QUESTION WORTH ASKING BEFORE ANY OTHER

When a warehouse feels full, the instinct is to look for more space.

Sometimes that's the right instinct. Often, it isn't the real problem at all. A site can be genuinely full and still be underperforming, because:

- Too much footprint is lost to aisles
- Height sits unused above every rack
- Products aren't positioned by how they actually move
- Forklifts need more clearance than they should
- Access requirements were never properly engineered in
- Data isn't driving storage decisions, guesswork and assumptions are
- Safety and segregation rules were bolted on, not designed in
- IBCs sit in low-density arrangements out of habit

So, before anyone talks about a new building, it's worth asking a sharper question:

Could this footprint, redesigned properly, store more - with better access and tighter control - than it does today?

04 THREE WAYS TO SOLVE IT

There's no single right answer for IBC storage. The right one depends on your site, your product profile, how the material moves, your safety context, and what the business case can support.

Most projects land on one of three paths - each carrying a different level of complexity, cost, and operational impact. None of them is automatically "the answer."

01 - DYNAMIC

Same handling, smarter layout

Redesign the layout itself. Less space lost to aisles, better use of the footprint - forklift handling stays as-is.

02 - SEMI-AUTOMATED

Mechanical assistance, where it earns its keep

Shuttle-based or similar handling improves density and cuts forklift movement, while parts stay manual.

03 - FULLY AUTOMATED

Engineered control across the whole operation

A serious step up in capacity, safety and inventory visibility - every movement under system logic.

05 DYNAMIC STORAGE

Often the right starting point when the core issue is capacity, and forklift handling still makes sense for the operation. It means redesigning the layout itself: less space lost to aisles, better use of the footprint, a structure that actually reflects how the site works.

WORTH CONSIDERING WHEN

- You need more IBCs in the same footprint
- Your layout loses too much space to aisles
- Forklift handling still suits the operation
- Throughput is manageable as it stands
- The case for automation isn't proven yet
- You want to delay or avoid a building extension

WHAT IT CAN DELIVER

Greater capacity, tighter layout discipline, less wasted aisle space, a clearer structure for stockholding, reduced pressure on overflow - and often a stronger foundation for automation later.

WHAT IT STILL DEMANDS

Access requirements, IBC weights, floor condition, fire safety, segregation and emergency access all still need proper design. Density that isn't safe or usable isn't density that helps you.

06 SEMI-AUTOMATED STORAGE

The middle ground. Shuttle-based or other mechanical handling that improves density and cuts forklift movement, while keeping parts of the operation manual.

WORTH CONSIDERING WHEN

- Forklift travel is becoming genuinely inefficient
- Density needs to improve but full automation feels premature
- Storage/retrieval patterns are repeatable enough to benefit
- You want a phased path rather than one big leap
- You want less manual handling inside the storage area

WHAT IT CAN DELIVER

Better density, less forklift travel within storage lanes, more structured operations, a clearer bridge toward a more automated future - without the full scale of investment on day one.

WHAT IT STILL DEMANDS

Real feasibility work on throughput, access, availability, maintenance, power, operator interfaces and emergency procedures. ATEX-sensitive environments need particularly careful assessment.

07 FULLY AUTOMATED STORAGE

Where the business needs a serious step up in capacity, control, safety and inventory visibility, all at once. Done properly, full automation takes forklift activity out of the storage area almost entirely, uses height the way it was always meant to be used, and puts every movement under system logic instead of memory.

WORTH CONSIDERING WHEN

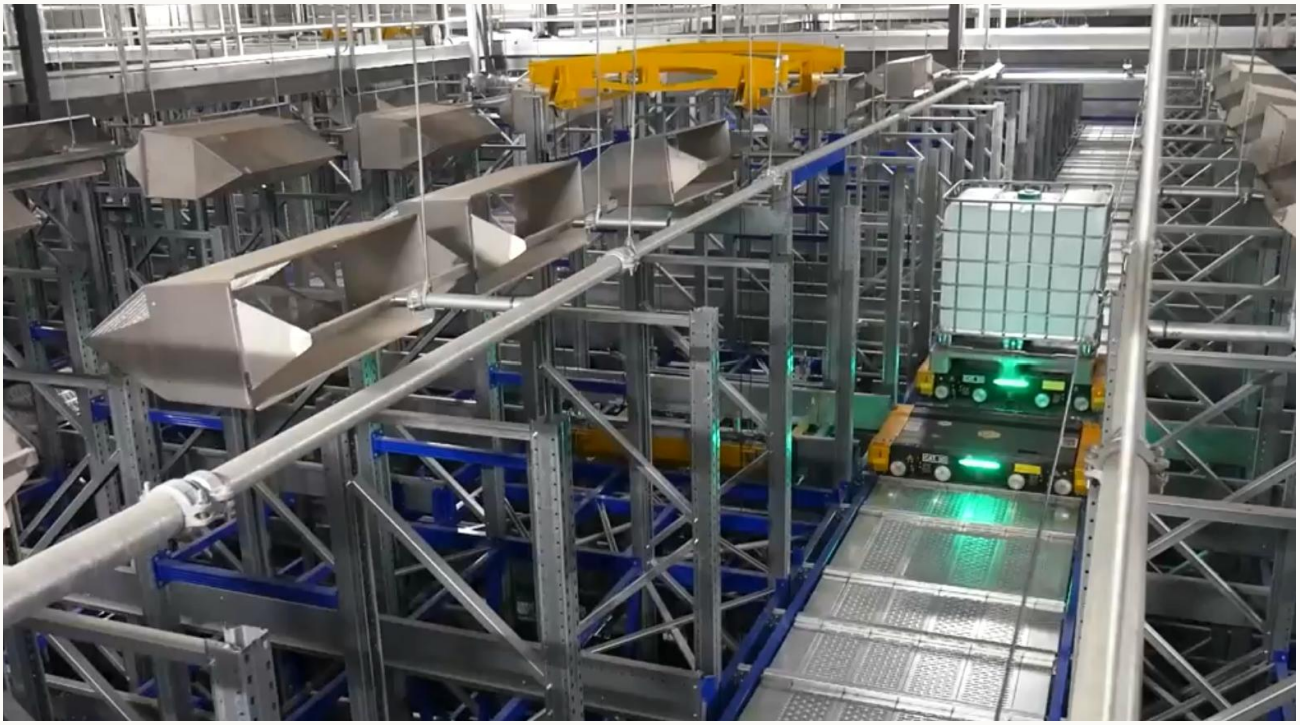
- You're storing high volumes of IBCs
- The storage area is a genuine bottleneck
- Forklift movement creates safety or efficiency concerns
- You need real control over product, batch and location data
- Warehouse expansion is genuinely on the table
- The business needs capacity resilience for years, not months
- Storage decisions need to be governed by rules, not habit
- Traceability requirements are becoming non-negotiable

WHAT IT CAN DELIVER

More capacity from the same footprint, far less forklift activity, real inventory visibility, consistent batch and location control, safer material movement, and infrastructure built for growth.

WHAT IT STILL DEMANDS

This is an engineering project, not an equipment purchase. Product data, dimensions, throughput, control logic, safety systems, software integration and fire strategy, ATEX and DSEAR all need to be worked through from day one.



08 ATEX, DSEAR AND HAZARDOUS-AREA THINKING

Chemical warehouses often store flammable liquids, vapours, gases or powders. Where an explosive atmosphere is even possible, storage and automation decisions have to sit inside the site's wider safety and compliance framework, not alongside it. That means thinking properly about:

- Hazardous area classification
- ATEX equipment requirements
- DSEAR risk assessment
- Product segregation
- Fire safety and emergency access
- Spill control and containment
- Operator exposure
- Forklift movement near higher-risk materials
- Site operating procedures and emergency response
- Interfaces with existing safety systems

Here's the part worth being direct about: automation doesn't make a site compliant. Compliance comes from proper risk assessment, competent design, the right equipment, safe procedures and controls built for that specific site. Automation can support all of that, but it isn't a substitute for any of it.

The mistake we see most often isn't choosing the wrong equipment. It's bringing hazardous-area thinking into the project after the storage concept is already decided. By then, you're redesigning, not refining. Getting engineering input at the very start is the difference between the two.

09 CAPACITY IS ONLY HALF THE ANSWER

It's tempting to measure success in IBCs per square metre. That number matters, but on its own it's an incomplete picture. In a chemical warehouse, a good storage system needs to answer harder questions too:

- What's stored where, right now?
- Which batch is moving, and can you prove it?
- Which IBC should come out first?
- Has the correct material actually been selected?
- Are storage rules followed, or worked around?
- Is the right stock available when needed?
- Can every movement be traced?
- Can anyone find anything without asking someone?

This is where warehouse control software earns its place. In automated or semi-automated environments, it's what actually manages IBC identity, location tracking, batch visibility, storage rules, movement history and the interface back into your wider ERP or production systems.

Faster movement isn't the goal in a chemical warehouse. Controlled movement is. The systems that deliver both - capacity and command of what's happening inside your four walls - are the ones worth pursuing.

10 HOW TO KNOW IF AUTOMATION MAKES SENSE FOR YOU

Before automation enters the conversation, the problem needs to be understood properly. A sound feasibility process works through five questions, in this order.

1 **What are you actually storing?**
IBC size and type, weight range, product and hazard profile, temperature requirements, batch or expiry rules, special handling needs.

2 **How much of it?**
Current and peak IBC counts, average stockholding, growth expectations, number of SKUs and product groups, required safety stock.

3 **How does it move?**
Receipts, putaway, production supply, replenishment, picking, dispatch, returns, empty IBC handling, quarantine or waste movement.

4 **What access do you actually need?**
FIFO or LIFO, batch-based access, segregation, priority retrieval, movement frequency, emergency and maintenance access.

5 **What are you designing around?**
Building height, floor loading, column grid, doors, fire exits, sprinklers, bunding, hazardous-area zones, existing equipment, forklift routes, site procedures, future expansion.

Get honest answers to these five, and the right direction usually becomes obvious. Skip them, and you're choosing equipment blind.

11 WHERE THESE PROJECTS USUALLY GO WRONG

- **Starting with the technology.** The starting point is never the system. It's the problem: capacity, safety, access, control, labour, expansion avoidance, or traceability. Pick equipment first and you're solving the wrong problem well.
- **Treating IBCs like pallets.** Different handling, weight profile, risk, access logic. A system built for pallet storage doesn't automatically translate.
- **Leaving hazardous-area thinking too late.** ATEX and DSEAR considerations shape equipment choice, layout, controls and procedures. They need to be in the room from the first conversation.
- **Chasing maximum density above everything else.** The densest possible layout isn't automatically the best one, if it compromises access, throughput, maintenance or resilience.
- **Underestimating the data.** Automation is only as good as the product, location and movement data feeding it. Weak data means weak system logic, no matter how good the hardware is.
- **Never actually comparing the options.** Full automation isn't always the answer. A proper feasibility review weighs all three paths against what the operation actually needs.
- **Leaving the right people out too long.** Operations, engineering, EHS, finance, production and site leadership all see this problem differently. The strongest solutions account for all of them.

12 WHAT A PROPER FEASIBILITY REVIEW COVERS

A feasibility review should tell you what's possible, what's practical, and what's actually worth pursuing - not push you toward a predetermined answer.

CURRENT OPERATION

Layout, capacity, storage method, forklift movement, access requirements, constraints, pain points.

PRODUCT AND CONTAINER DATA

Dimensions, weights, product and hazard profile, batch and expiry rules, segregation and handling needs.

SITE CONSTRAINTS

Footprint, clear height, floor loading, fire exits, fire protection, bunding, hazardous-area zones, existing infrastructure, expansion limits.

MOVEMENT REQUIREMENTS

Receipts, putaway, retrieval, production supply, dispatch, empty IBC movement, peak periods, throughput.

SOLUTION OPTIONS

High-density, semi-automated, fully automated, software and control requirements, integration points, an indicative business case.

The goal at this stage isn't a final design. It's clarity on which direction deserves real development.

13 IBC STORAGE ASSESSMENT CHECKLIST

Use this before you go anywhere near a storage decision.

CURRENT STORAGE

How many IBCs do you store now, and at peak? What's the current footprint, and how are IBCs stored? How many storage locations do you have? Do you use overflow or external storage, and how often?

IBC DETAILS

What sizes and types are in use? What's the weight range? Are any damaged, returned, empty or quarantined? Any special handling requirements?

PRODUCT PROFILE

What products, and are any hazardous, flammable or temperature-sensitive? Any segregation, batch, expiry or traceability requirements?

MOVEMENT AND ACCESS

How many IBCs move per day, and when are the peaks? Do you need FIFO, LIFO or batch-based access? How often are IBCs moved for production or dispatch? How many forklift movements does this really take? Are operators regularly moving IBCs just to reach others?

SITE CONSTRAINTS

Available floor area and clear height? Columns, doors or structural limits? Fire exits or emergency access nearby? Bunding, spill control or hazardous-area zones? Existing sprinklers or fire systems? Any restrictions on forklift movement?

13 IBC STORAGE ASSESSMENT CHECKLIST

SYSTEMS AND CONTROL

How is stock managed today? Is batch and location data reliable? Is there a WMS, ERP or production system in place? Are storage rules enforced by people or by system logic? What reporting do you actually need?

BUSINESS DRIVERS

What's really driving this review? Capacity, safety, forklift traffic, labour efficiency, expansion avoidance, external storage cost, traceability, production support, customer service, or compliance?

Answer these honestly, and an engineering team can tell you fast whether high-density, semi-automated or fully automated storage deserves further exploration.

14 FIFTEEN QUESTIONS WORTH ASKING BEFORE YOU INVEST

1. Are we solving the real problem, or just adding more storage?
2. Could our existing footprint hold more with a better layout?
3. How much capacity do we actually need, now and in three years?
4. What level of access do we genuinely need to each IBC?
5. How much does batch, product and location control actually matter?
6. How much forklift movement could realistically disappear?
7. Are there hazardous-areas or DSEAR factors in play?
8. What site constraints will shape the design?
9. What happens if we do nothing for another 12–24 months?
10. What is inefficiency, overflow or expansion actually costing us?
11. Does this call for high-density, semi-automation or full automation?
12. Who needs to be in the room for this decision?
13. What data do we need to build a credible business case?
14. Will this still make sense as we grow?
15. What would make this project a genuine commercial success?

These are the questions that move the conversation away from equipment, and toward value.

15 BUILDING A BUSINESS CASE THAT HOLDS UP

The strongest business cases don't lean on one benefit. They stack several, because that's how the real cost of doing nothing actually shows up.

- **Capacity gain** - how much more fits in the footprint you already have.
- **Expansion avoidance** - what a new building, delayed or avoided entirely, is worth.
- **Lower external storage cost** - what comes back in-house, and what that saves.
- **Labour and movement efficiency** - forklift time, travel time, manual intervention, all reduced.
- **Safety and risk reduction** - less unnecessary handling, less congestion, less operator exposure.
- **Inventory accuracy** - fewer errors, fewer stock searches, less manual reconciliation.
- **Production support** - materials available when production actually needs them.
- **Operational resilience** - a warehouse that can grow with you, instead of needing another short-term fix every eighteen months.

Combine these, and the case for change tends to make itself.

16 WHERE TO START

If your IBC storage is becoming a constraint, the first move isn't choosing a system. It's understanding the problem properly. Start by pulling together:

- Current and peak IBC numbers
- IBC dimensions and weights
- Product types and hazard profile
- Current layout, footprint and height
- Existing handling methods
- Known safety or site constraints
- Current pain points and growth expectations
- Movement volumes and access requirements

With that in hand, an engineering-led review can tell you honestly whether the right direction is high-density storage, semi-automation, full automation, or something else entirely.

The goal is simple: make the right decision before you commit the capital, not after.

17 HOW THISTLE SYSTEMS CAN HELP

Thistle Systems has spent over three decades solving warehouse storage and automation problems through practical engineering, not off-the-shelf answers. For IBC-heavy chemical warehouses, we help assess:

- Existing storage capacity and space utilisation
- IBC movement and access requirements
- High-density, semi- and fully automated options
- ATEX and hazardous-area considerations
- Warehouse control and inventory visibility
- Indicative feasibility and next steps

Where automation is the right answer, our engineering team designs and builds the system in-house, including the control software that governs how it runs - so the solution is built around your site and its unique demands, rather than an “off-the-shelf-solution” or one which has been adapted from someone else’s.

REQUEST AN IBC STORAGE CAPACITY REVIEW

If IBC storage, chemical warehouse capacity, hazardous goods handling or automation is on your desk right now, this is the conversation worth having next.

An IBC Storage Capacity Review looks at whether your existing footprint could be redesigned to deliver more capacity, better handling and tighter control - before any capital gets committed to expansion.

GET IN TOUCH

Thistle Systems - Max The Cube®

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