

Certified vacuum solutions for every stage of your unique manufacturing environment.

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INTRODUCTION

Protect your product, your people, and your production

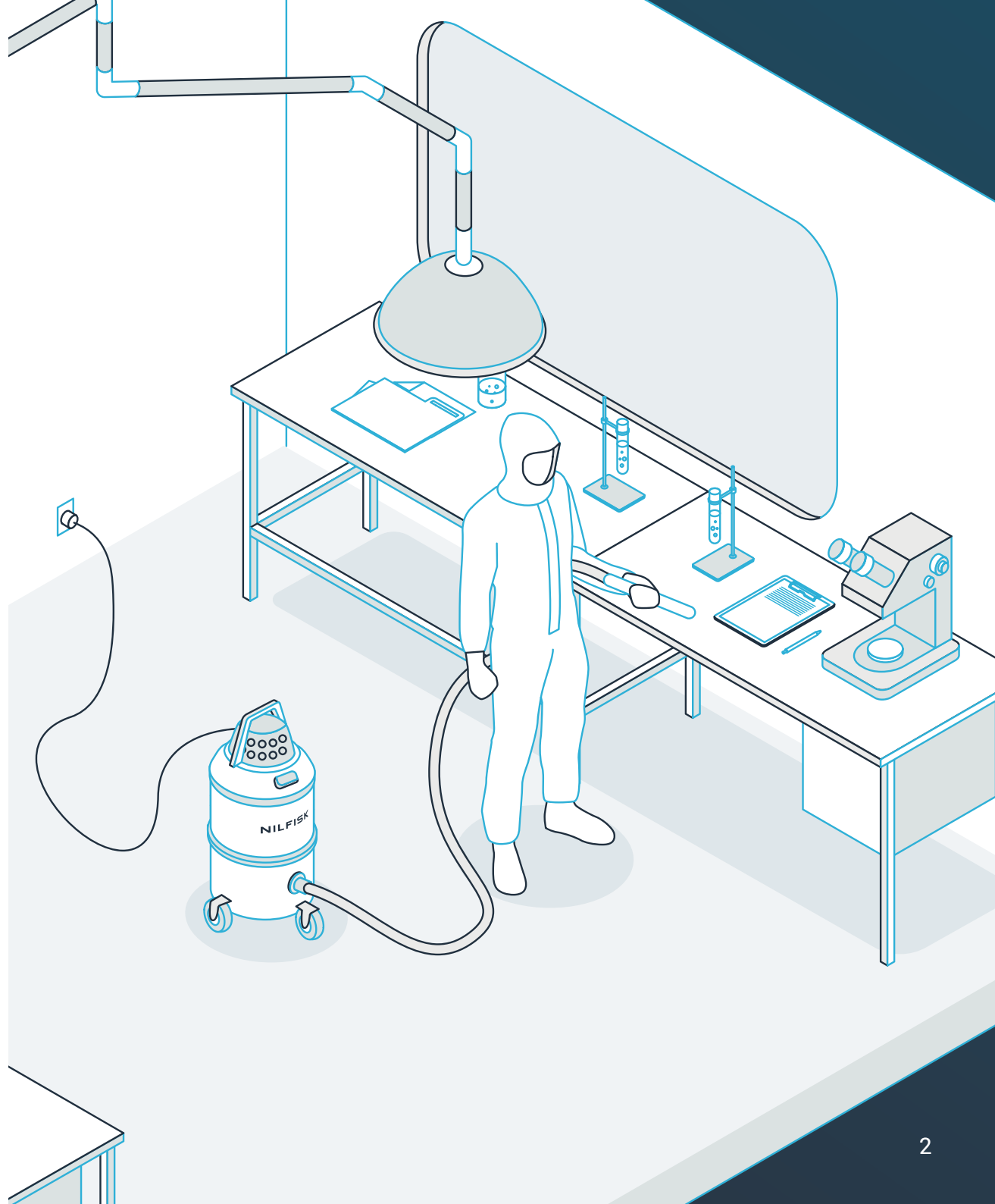
In pharmaceutical manufacturing, vacuum solutions are as critical as the production equipment they work alongside. They protect a batch from contamination, keep an auditor satisfied, get a line back up after a shutdown, and make sure the person operating it goes home safe.

As a pharmaceutical manufacturer, your needs are specific and non-negotiable:

- Prevent product contamination
- Ensure worker safety
- Improve production uptime
- Comply with regulations

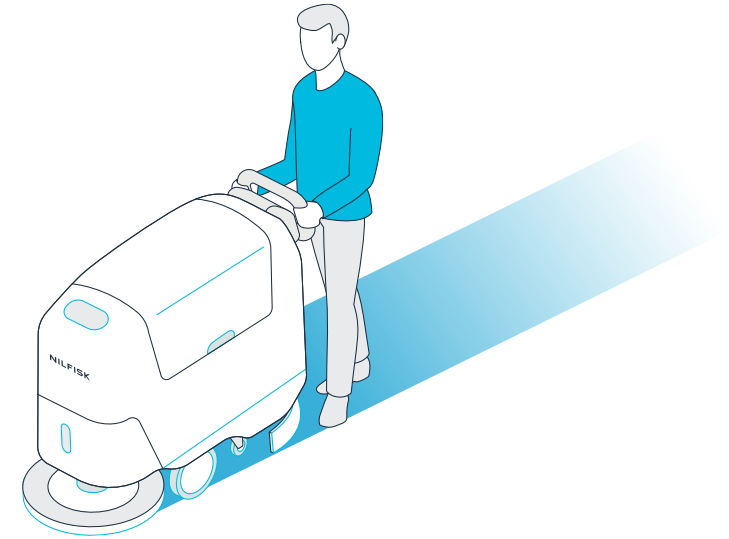
We address these needs with deep industry expertise and tailor-made vacuum solutions that clean from floor to ceiling, collect dust at the source, convey materials gently and hygienically, and contain potent compounds up to the highest risk levels.

Nilfisk is the pharmaceutical industry's most complete vacuum solutions partner — covering every production stage, every zone, and every regulatory requirement.



From floor to ceiling, source to disposal — the certified capabilities behind our pharma solutions

Pharmaceutical production demands certified systems that work across your entire process — addressing contamination, worker safety, uptime, and compliance at every stage. Our four core capabilities are designed to do exactly that, deployed individually or combined to meet the specific demands of your facility.



Cleanliness is the key to compliance, safety, and product quality.

Clean from floor to ceiling

Maintaining audit-ready cleanliness across every zone of a pharmaceutical facility requires more than regular floor cleaning. From production areas and cleanrooms to equipment surfaces and transfer zones, GMP-compliant cleaning equipment and accessories must be designed to meet the hygiene standards your facility demands — with no pockets for contamination, surfaces that can be sanitized quickly between runs, and accessories that reach every area safely.

A small amount of dust can be a big issue.

Collect dust at the source

Capturing dust and hazardous particles at the point of generation — rather than after dispersal — is one of the most critical steps in protecting product quality and operator safety. Certified vacuum systems with HEPA and ULPA filtration collect fine particles before they can settle on surfaces, contaminate batches, or expose operators to harmful compounds. Depending on your facility's explosion risk classification, ATEX or ACD-rated solutions ensure your collection systems are safe and compliant.

From A to B — gently, hygienically, without compromise.

Convey materials gently

Moving powders, granules, and capsules between production stages without contamination risk or manual handling demands more than a standard conveying system. Dense phase pneumatic conveying moves materials in a gentle, low-velocity enclosed flow — minimizing turbulence, preserving material integrity, and eliminating the segregation risks that come with inconsistent handling. The result is a cleaner, safer, more efficient production process from start to finish.

Protecting your operators starts with the right containment solution.

Contain hazardous particles

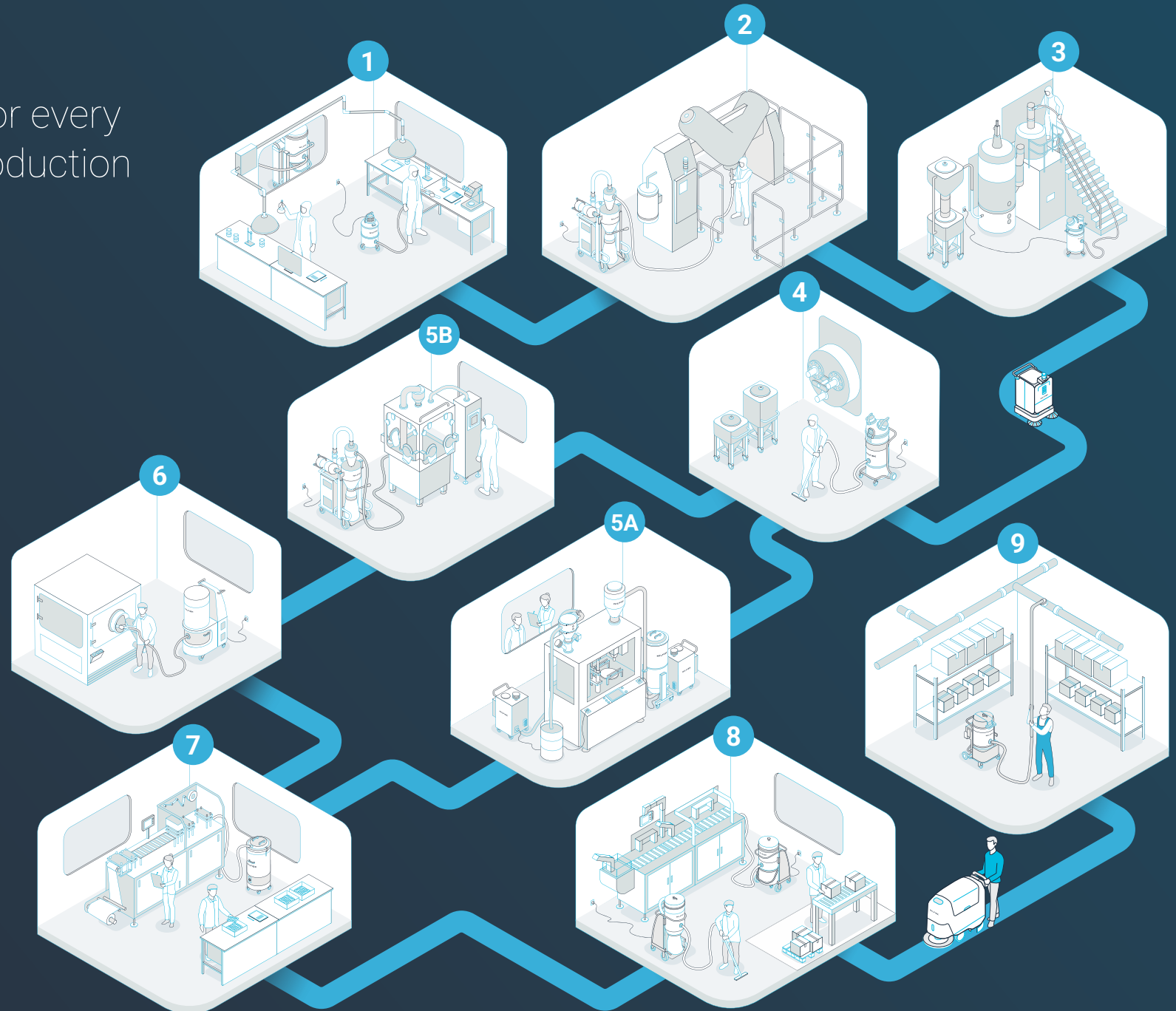
When handling APIs, HAPIs, and other potent compounds, containment is non-negotiable. High-containment solutions rated to your OEB classification — and validated to third-party SMEPAC certification — provide documented proof that your operators are protected and your process is compliant. From safe-change filter systems to enclosed disposal solutions, every element is engineered to keep what's inside, inside.

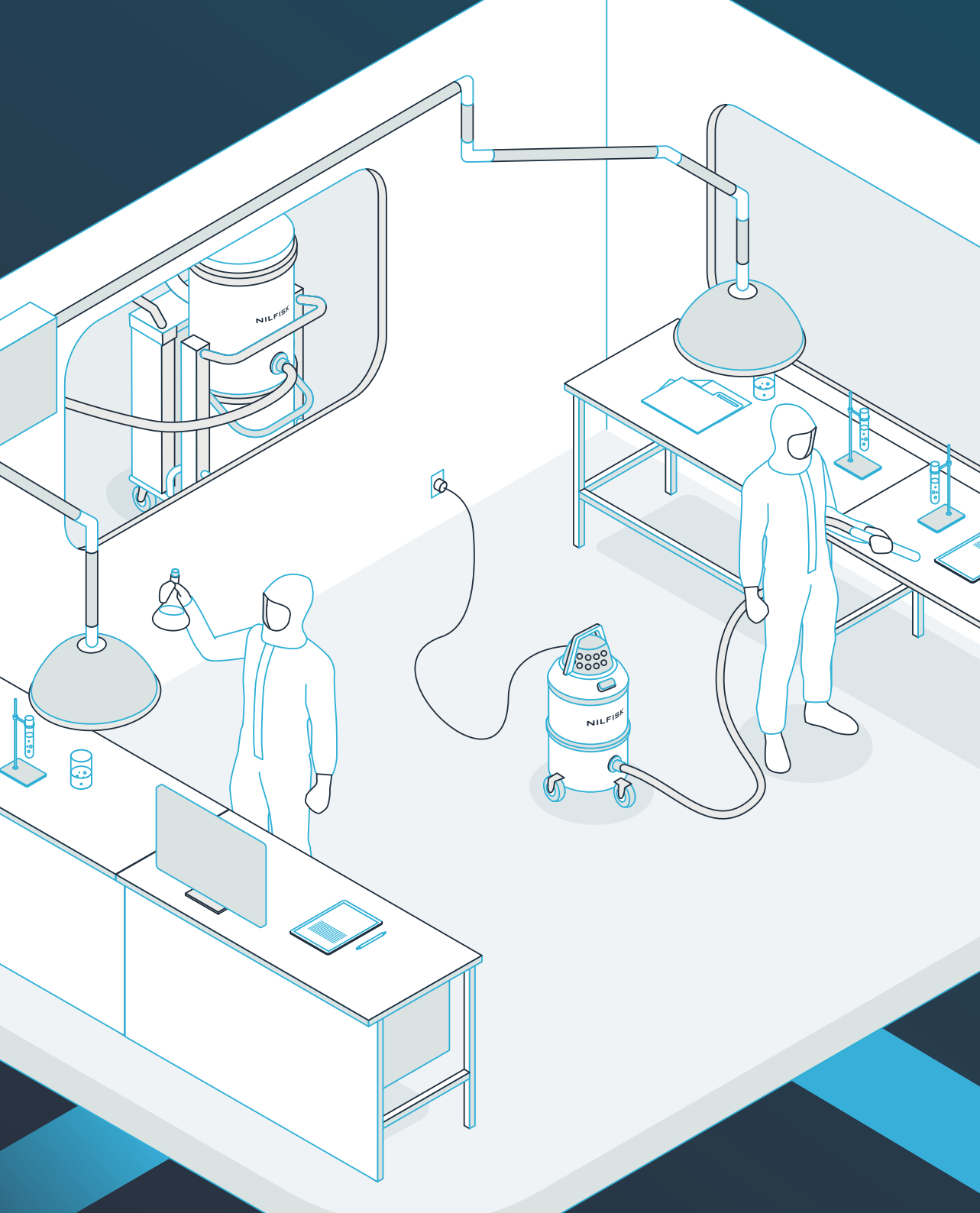
Vacuum solutions for every stage of pharma production

Every stage of pharmaceutical production carries its own specific risks, requirements, and regulatory demands. From the first weigh-up in the lab to the final product leaving the warehouse, vacuum solutions play a critical role in keeping your product pure, your people safe, and your process compliant.

The following pages break down each stage of a typical pharma operation — what's at stake, how vacuum solutions help, and what to look for when selecting the right equipment.

1. Research
2. Mixing
3. Granulation
4. Blending
- 5A. Encapsulation
- 5B. Tableting
6. Coating
7. Blistering
8. Cartoning
9. Warehousing





1 RESEARCH

Keep your lab safe

What's at stake

Handling and weighing powders at lab workstations generates dust that can expose operators to potent compounds and contaminate the environment. Even in small quantities, airborne particles from APIs and HAPIs present a real occupational risk – and a contamination threat to inbound materials being tested and validated.

Role of vacuums

Suction hoods connected to mobile vacuums or central systems capture dust and fine particles at the source during material testing and process validation. High-containment solutions enable safe recovery and disposal of potent compounds. Dedusting systems and cleanroom vacuums keep the lab clean, safe, and audit-ready.

What to consider

- OEB-rated containment for APIs and HAPIs
- GMP compliance, including autoclavable equipment and ISO cleanroom requirements
- ATEX certification where combustible dust is present
- Flexible mobile solutions for both dedusting and general cleaning

Suggested Nilfisk solutions

Central vacuum systems connected to fixed or mobile units such as the **Nilfisk T40W**

Cleanroom vacuums such as the **Nilfisk IVT1000 CR**

2

MIXING

Eliminate contamination
in your mix**What's at stake**

When APIs meet excipients, dust is inevitable — exposing operators to potent compounds and risking contamination of the mix. Fast, thorough cleaning between batches is essential to keep production on schedule and maintain ISO compliance.

Role of vacuums

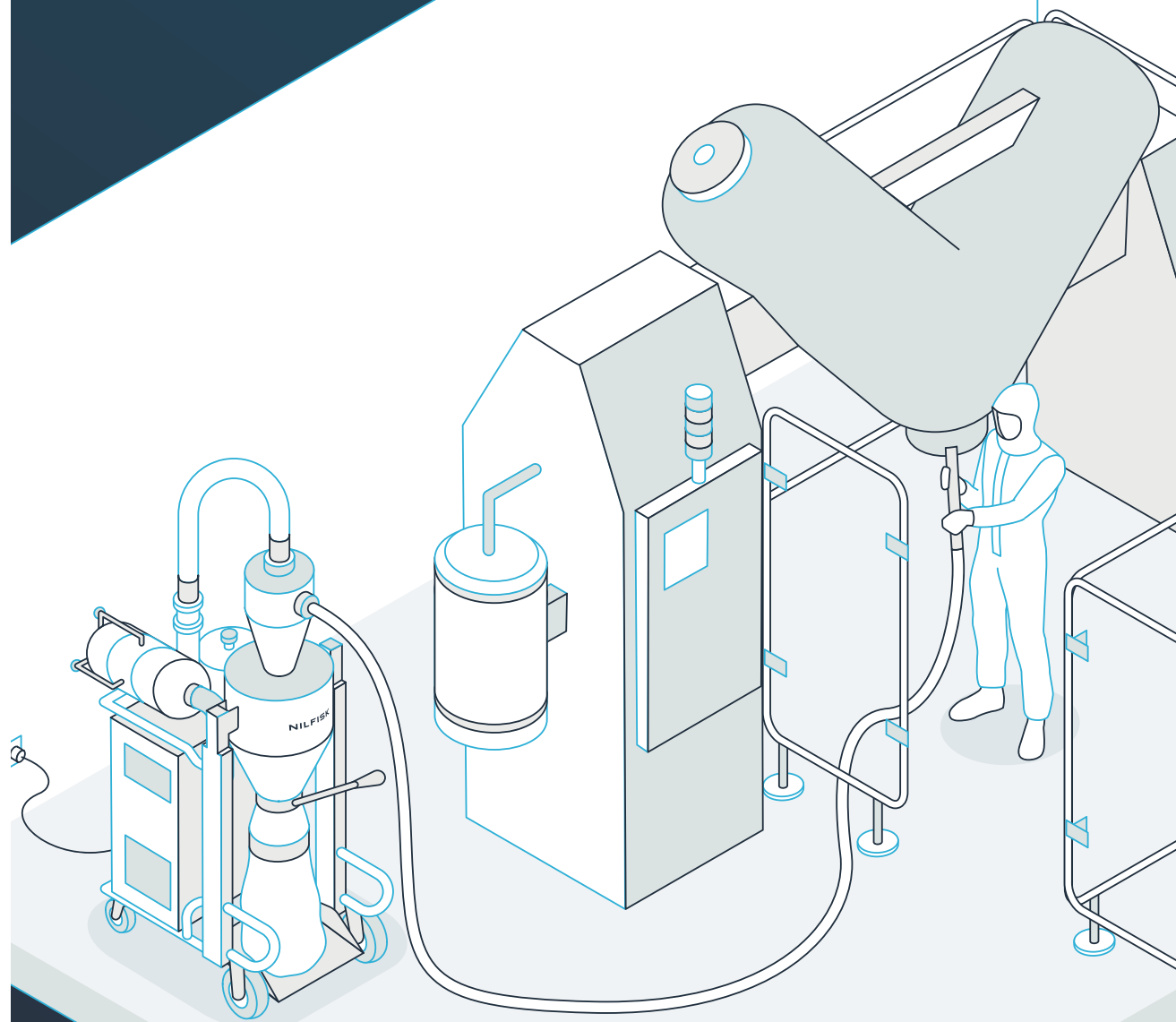
Vacuum solutions allow you to clean your mixer properly, collect fine particles at the source and safely contain them, protecting operators from exposure while maintaining the integrity of the mix — especially when handling high-potency compounds.

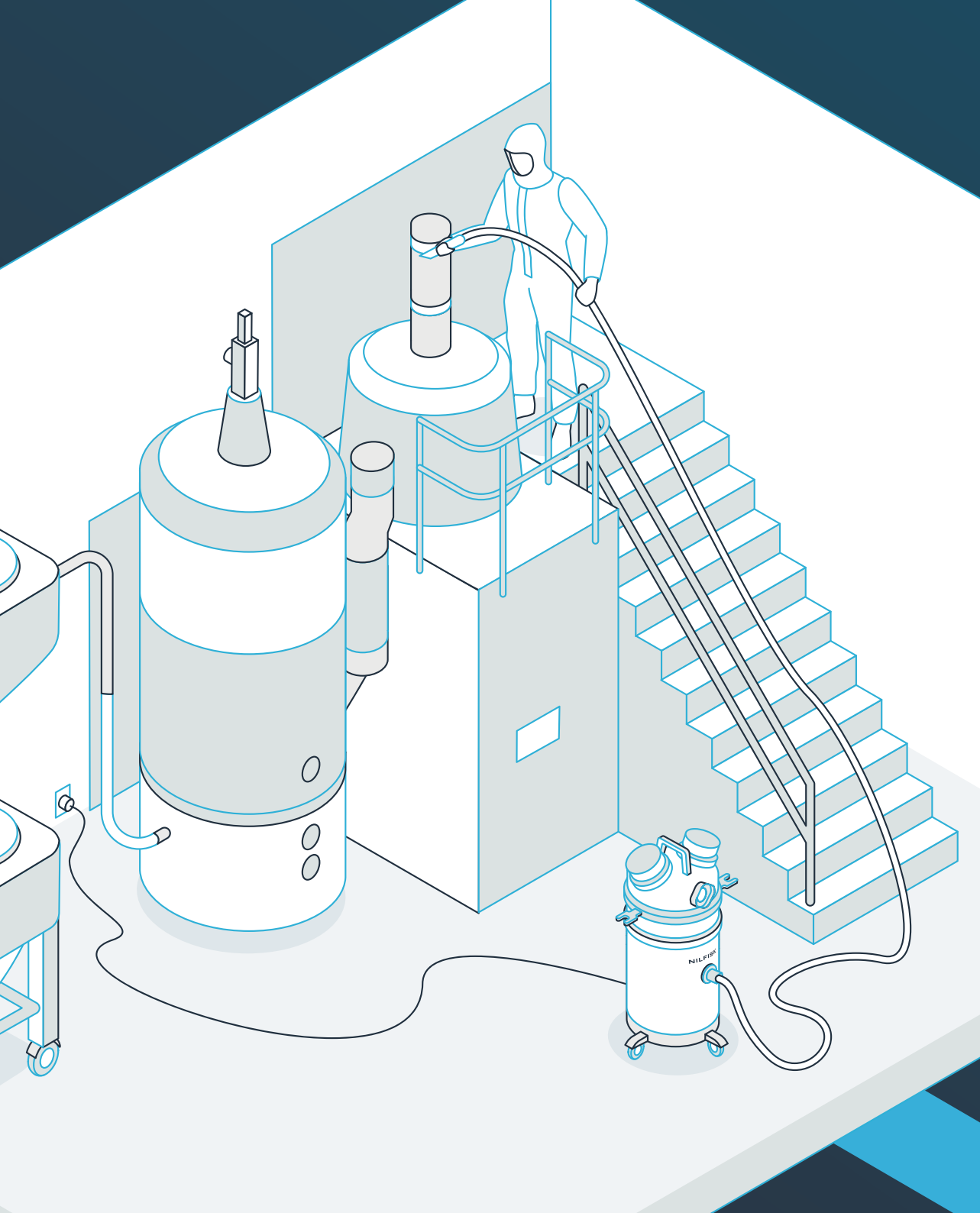
What to consider

- Containment rated up to OEB 5 for APIs and HAPIs
- Upstream HEPA and downstream ULPA filtration
- Bag-in-bag-out (BIBO) safe filter replacement systems
- Third-party SMEPAC certification

Suggested Nilfisk solutions

Portable dust containment systems such as the **Nilfisk PDC413**





3 GRANULATION

Ensure product quality and compliance

What's at stake

Binding fine powders into granules generates significant dust, raising contamination risk in the production environment and compromising air safety. Airborne particles can settle on equipment and surfaces, affecting product quality and creating compliance issues.

Role of vacuums

Vacuum solutions capture dust during or immediately after material spillage, before it has a chance to disperse. This keeps process equipment clean and free of contamination, protecting product quality and ensuring the granulation environment stays compliant.

What to consider

- Compact design and flexible usage
- Ease of use and intuitive operation
- GMP compliant materials and stainless steel components
- Wide range of accessories to reach all process areas
- Certified high filtration and safe material recovery

Suggested Nilfisk solutions

Compact industrial vacuums such as the **Nilfisk VHS010**

4

BLENDING

Maintain a contamination-free blend

What's at stake

Adding lubricants and excipients to granules requires clean, controlled conditions. Residual powders and process contaminants carried over from earlier stages raise the risk of cross-contamination between batches.

Role of vacuums

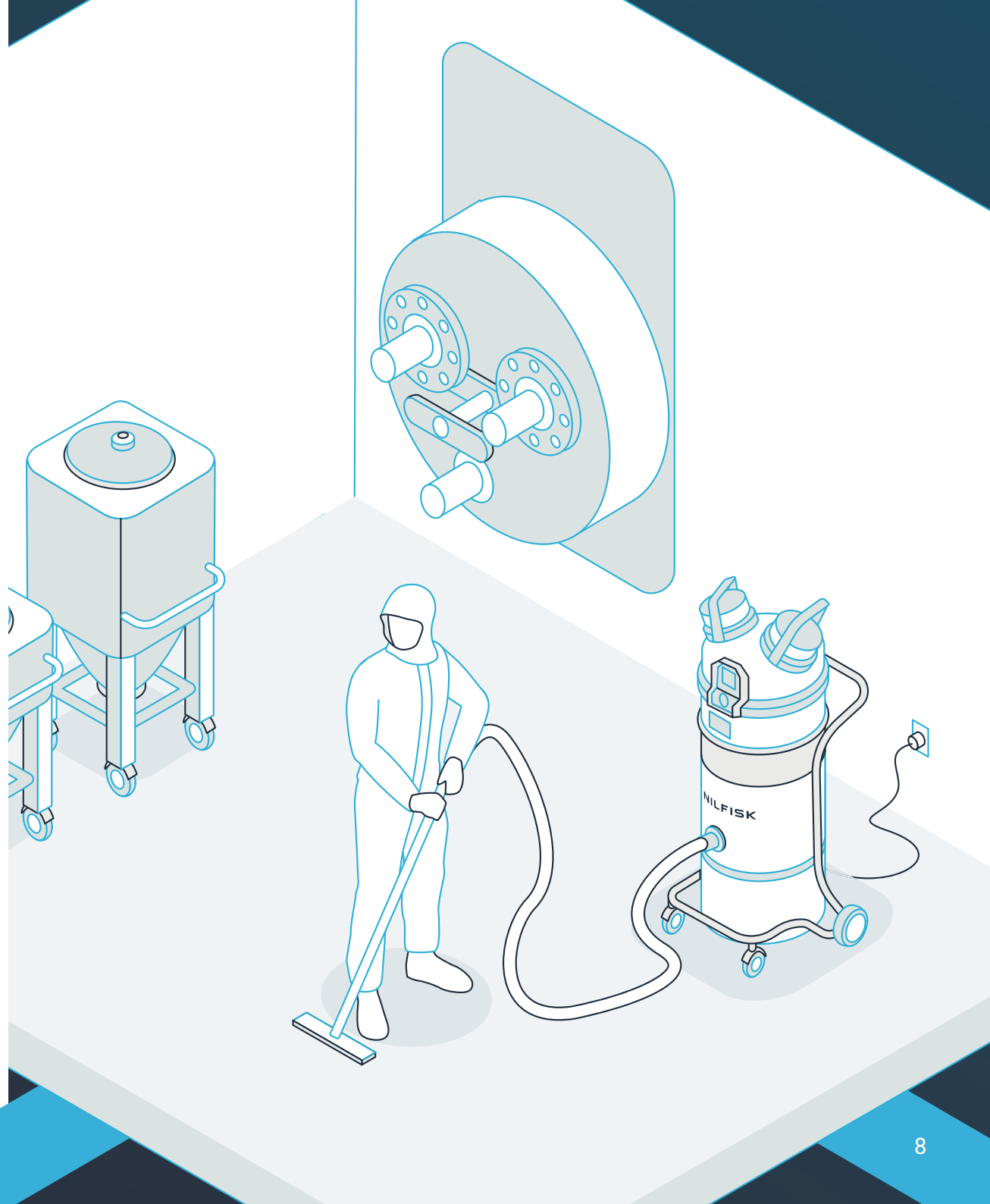
Vacuum solutions ensure effective removal of residual powders and process contaminants inside and outside IBCs, preventing cross-contamination while safely containing any potent compounds.

What to consider

- Upstream HEPA and downstream ULPA filtration
- Wet and dry vacuum capability
- Safe disposal systems such as Safe Bag
- Autoclavable container and pharma-certified accessories
- GMP design and ISO compliance

Suggested Nilfisk solutions

Cleanroom wet and dry vacuum systems such as the **Nilfisk VHS110 CR**



5A FORMULATION – ENCAPSULATION

Protect capsule integrity

What's at stake

Filling capsules with microgranules demands high product quality and hygienic transfer. Conveying-induced mechanical stress and flow variability can cause capsule deformation, separation, and irregular feeding – directly affecting filling performance and production uptime.

Role of vacuums

Pneumatic conveying systems transport large quantities of material and empty capsules gently, safely, and efficiently to the filling line, maintaining capsule integrity and ensuring consistent, uninterrupted feeding.

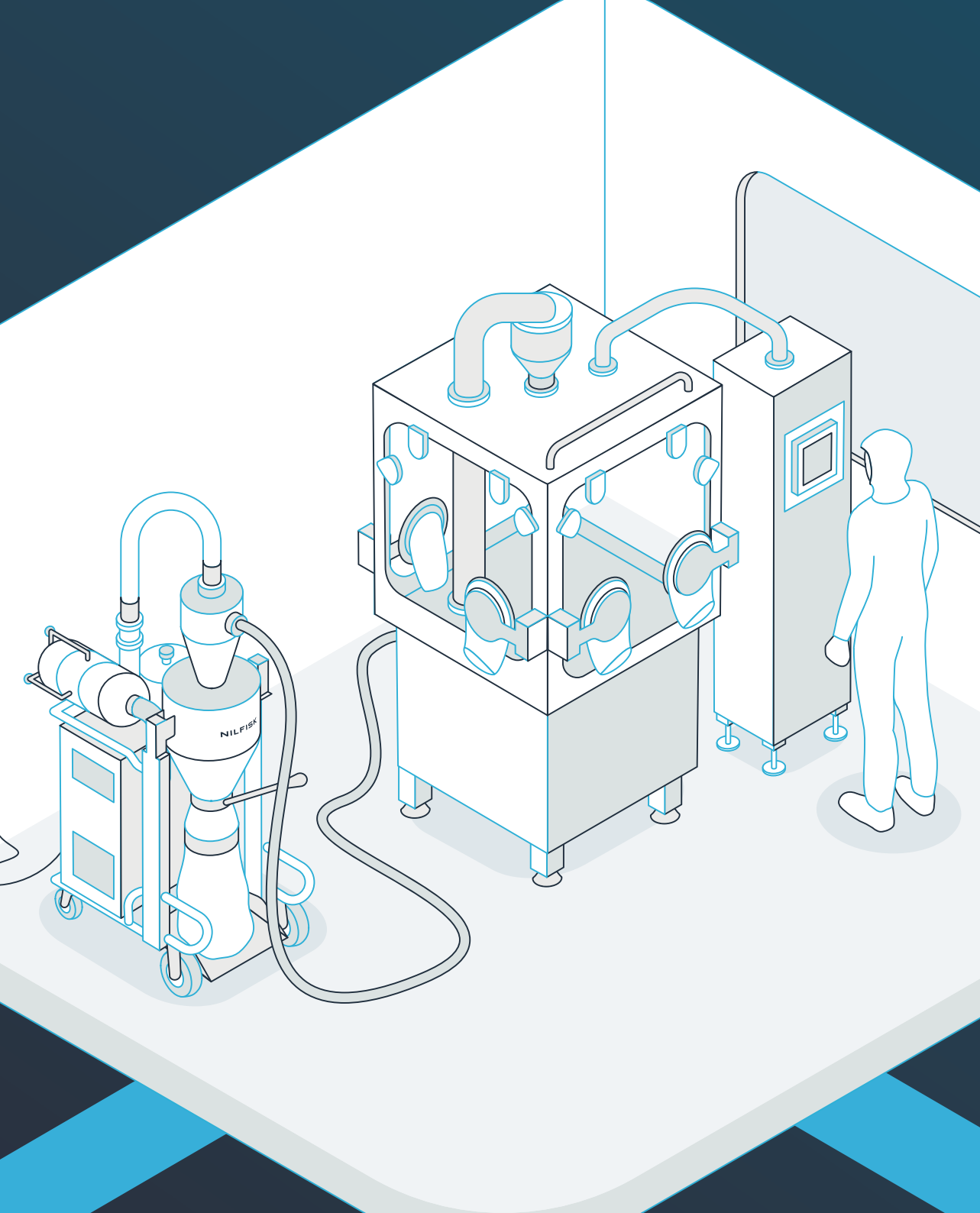
What to consider

- Gentle, low-stress conveying to preserve capsule integrity
- GMP and MOCA compliance
- Process connectivity for start/stop and alarm integration
- Validation and compliance support, including IQ/OQ documentation
- Easy to clean and maintain

Suggested Nilfisk solutions

Pneumatic conveyors for empty capsules such as the **Nilfisk 9GT**





5B

FORMULATION – TABLETTING

Collect and contain dust at the press

What's at stake

Dust and powder residues generated during tablet compression must be removed continuously to protect product quality and machine performance. This applies especially to fully isolated setups where machinery is enclosed and operators access it through glove ports. Left unmanaged, dust accumulation causes process interruptions, increased maintenance needs, and reduced efficiency.

Role of vacuums

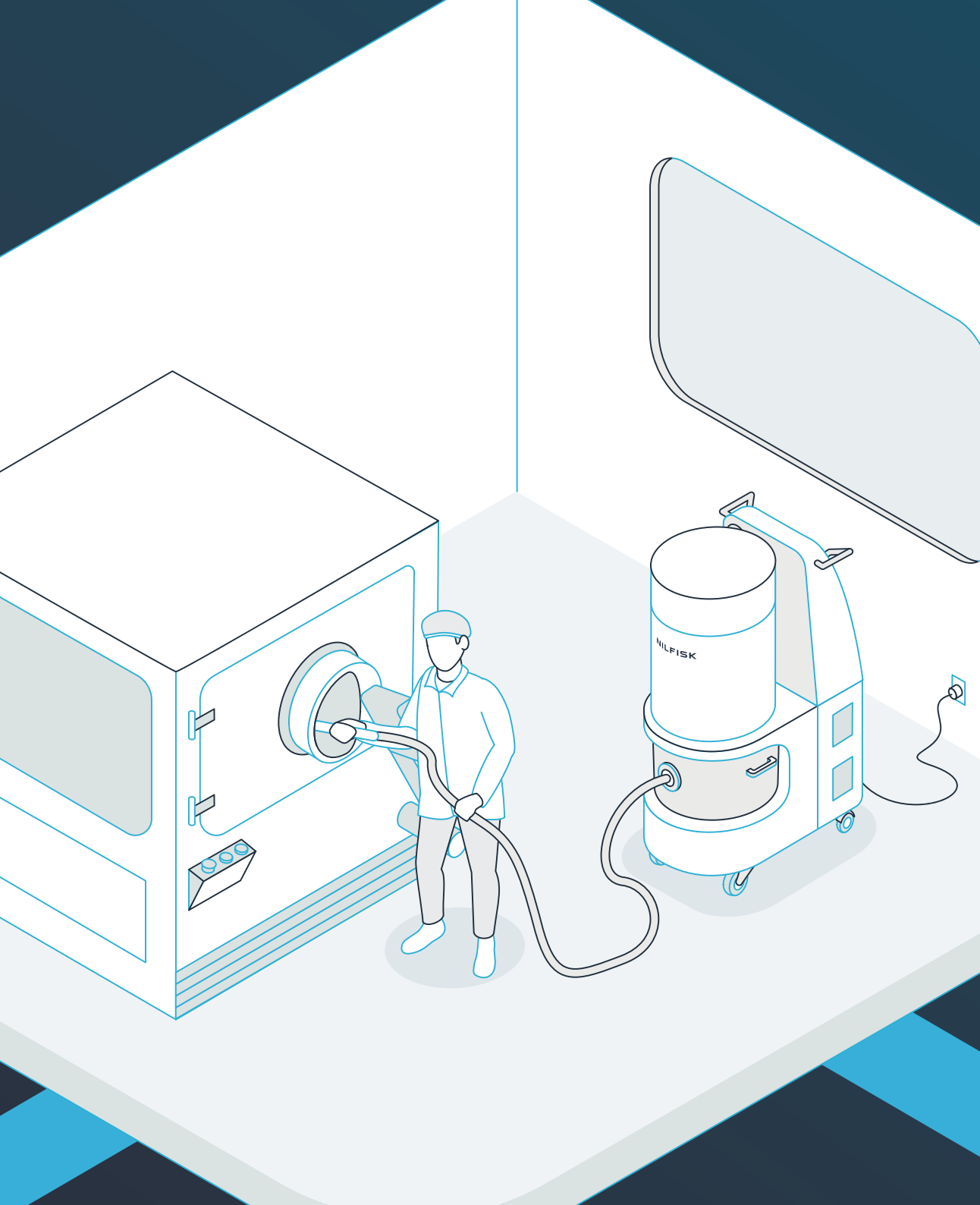
Compact mobile or stationary high-efficiency containment solutions recover and discharge dust while maintaining your facility's OEL limits. Tool-free handling and GMP compliant design make them practical for use in even the most demanding and hygienic production environments.

What to consider

- Containment rated up to OEB 5 for APIs and HAPIs
- Upstream HEPA and downstream ULPA filtration
- Safe, tool-free filter replacement
- Material discharge via bag-in-bag-out (BIBO) system
- Third-party SMEPAC certification

Suggested Nilfisk solutions

Portable dust containment solutions such as the **Nilfisk PDC413**



6 COATING

Keep your coating process clean

What's at stake

Fine spray particles and powder residues accumulate on equipment surfaces during coating, increasing cross-contamination risk and extending changeover times between batches.

Role of vacuums

Vacuum solutions ensure effective removal of spray particles and powder residues, maintaining a clean, controlled environment in full GMP compliance. Flexible solutions with suitable accessories enable safe cleaning of hard-to-reach areas such as baffles and spray arms, reducing operator exposure and supporting faster changeovers.

What to consider

- GMP compliance and absolute upstream and downstream filtration
- ATEX or ACD certification
- Flexible mobile solutions
- Pharma-certified accessories for baffles, spray arms, and hard-to-reach areas

Suggested Nilfisk solutions

GMP-compliant vacuum systems such as the **Nilfisk VHW321**

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BLISTERING

Capture waste without interruption

What's at stake

High volumes of packaging offcuts, dust, and debris accumulate rapidly during blistering, obstructing machines and sensors — causing unexpected stoppages and reducing line efficiency.

Role of vacuums

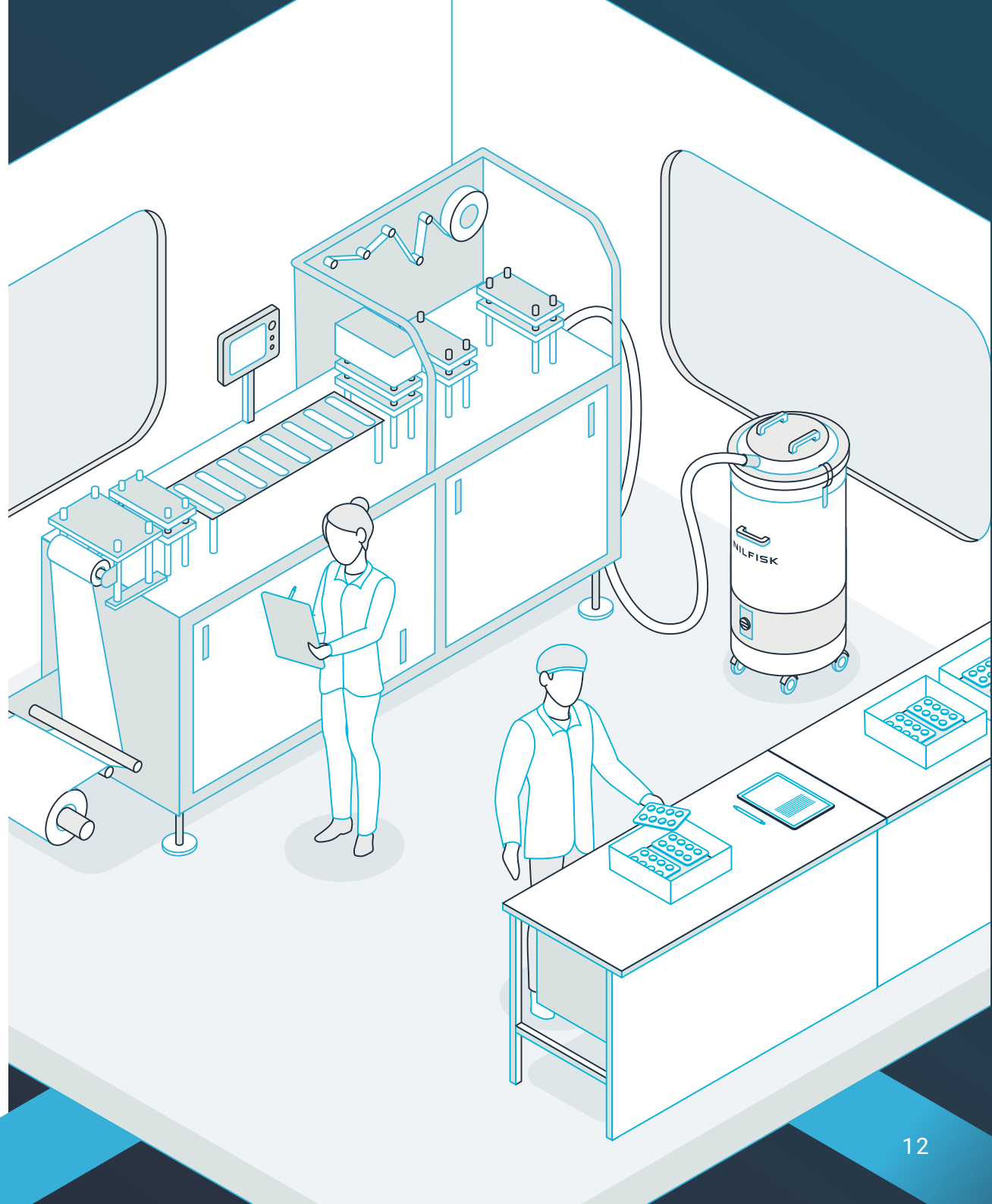
Vacuum collection systems capture dust, debris, and trim waste continuously, keeping sensors clear and lines running without interruption — with ATEX or ACD options available depending on the explosion risk classification of your environment.

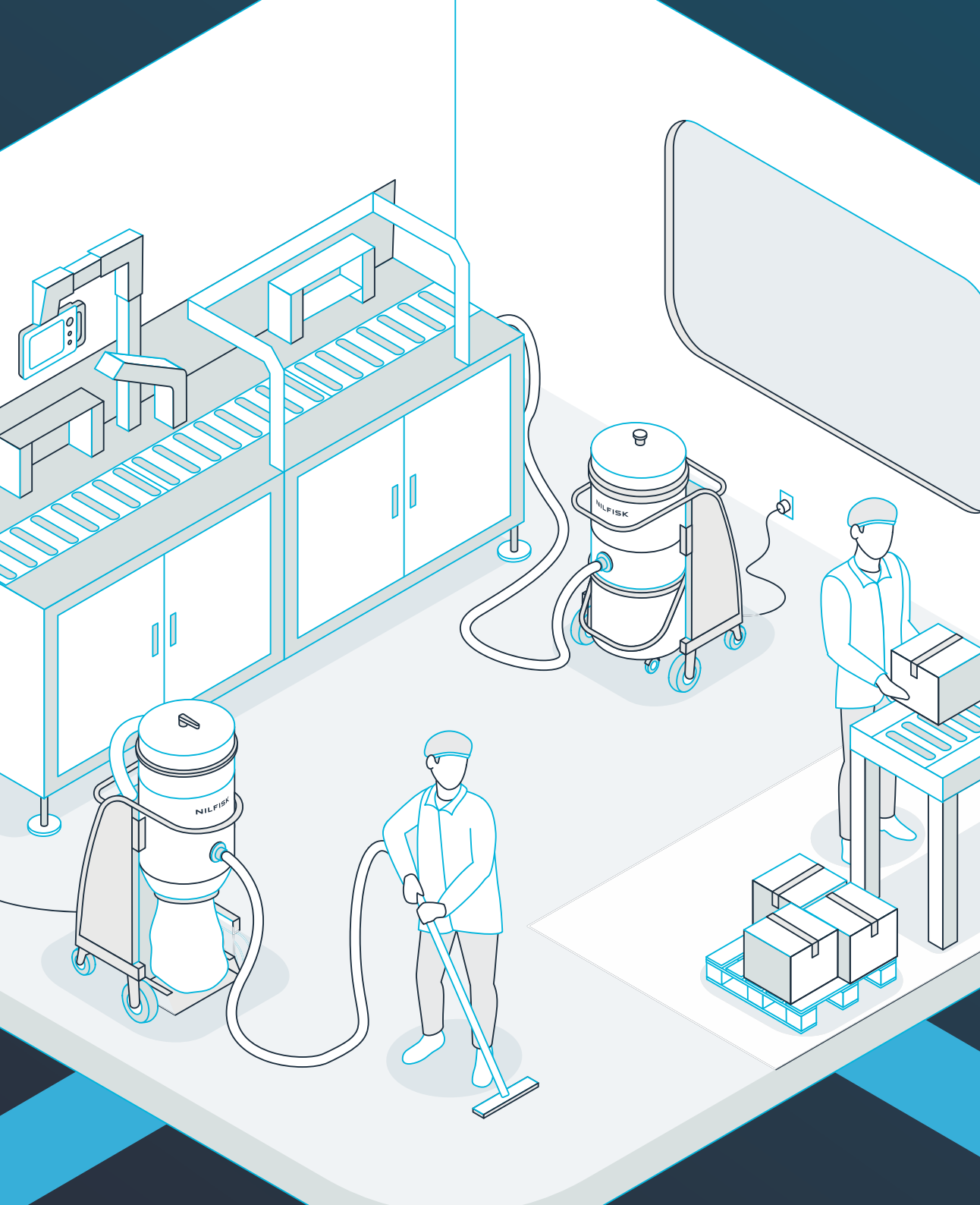
What to consider

- High-capacity continuous recovery
- ATEX or ACD certification
- Vacuums with compression capabilities

Suggested Nilfisk solutions

Industrial vacuum systems such as the **Nilfisk R series 3507 W R 3X**





8 CARTONING

Keep your packaging line running

What's at stake

Dust and debris from packaging can accumulate on surfaces, sensors, and equipment, causing unexpected stoppages and reducing line efficiency.

Role of vacuums

Vacuum solutions support continuous cleaning of production lines and surrounding areas, removing dust, debris, and packaging waste to maintain smooth operations and hygiene compliance.

What to consider

- Compact design for tight production environments
- High-capacity continuous operation
- Hazardous dust collection where required

Suggested Nilfisk solutions

Industrial vacuum systems such as the **Nilfisk CTS40**

9

WAREHOUSING

Maintain hygienic storage,
from start to finish**What's at stake**

Large warehouse areas present real cleaning challenges — from tripping hazards caused by cables to hard-to-reach areas under pallets and on racking. Insufficient cleaning can lead to contamination of raw materials and finished products.

Role of vacuums

Scrubbers, robotic cleaners, and vacuum solutions maintain floor cleanliness and contamination control across large warehouse areas, from intake to dispatch. Cordless solutions eliminate tripping hazards while a wide range of accessories enables cleaning from floor to ceiling — including racking and under pallets.

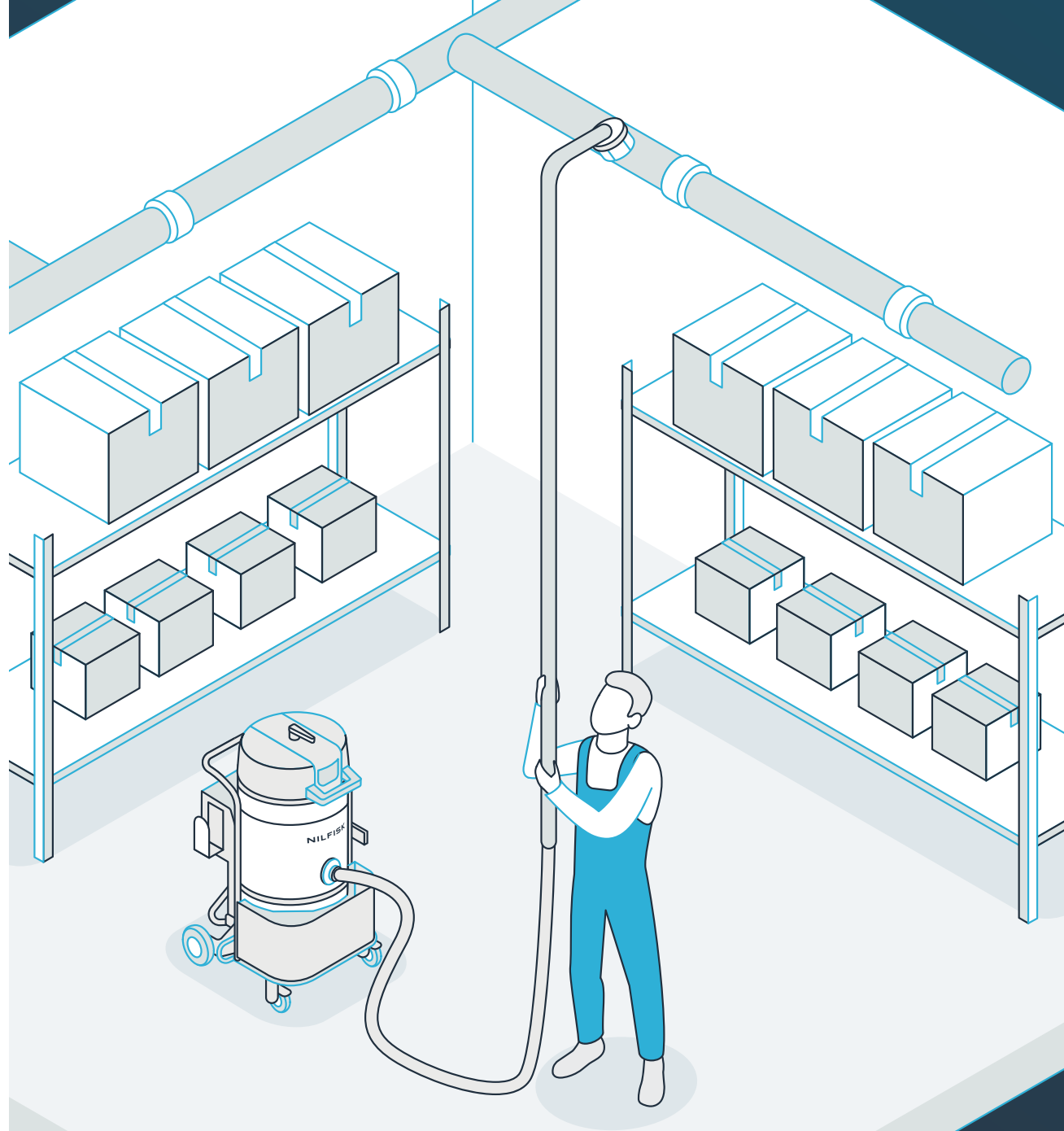
What to consider

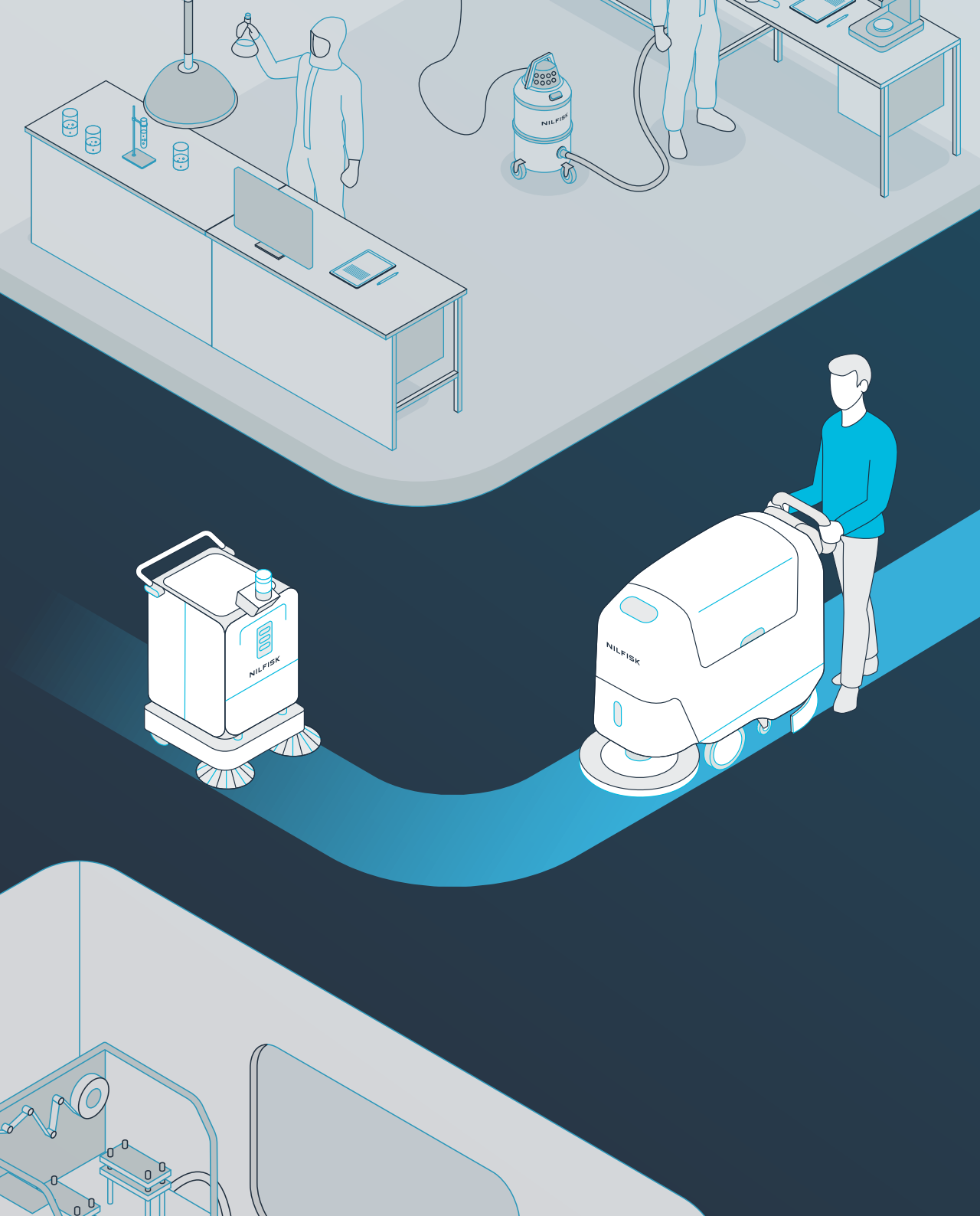
- Cordless operation for cable-free, safe working conditions
- Swappable batteries for continuous operation
- High filtration performance
- Robotic cleaning machines for autonomous floor maintenance
- Wide accessory range for floor, racking, and under-pallet cleaning

Suggested Nilfisk solutions

Battery vacuums such as the **Nilfisk VHB120**

Robotic floor scrubbers such as the **Nilfisk SC25**





HALLWAYS AND TRANSFER ZONES

Keep contamination contained between zones

What's at stake

High-traffic corridors and transfer areas between production zones are a common source of cross-contamination. Dust and residues carried between stages can compromise product integrity and hygiene standards across the facility.

Role of vacuums

Compact, agile vacuum and floor cleaning solutions maintain consistent cleanliness in tight spaces and high-traffic areas, controlling dust and residues between production zones without disrupting operations. Robotic scrubbers can automate routine floor cleaning in corridors and transfer areas, delivering consistent results around the clock without operator intervention.

What to consider

- Compact, easy-to-maneuver equipment for tight spaces
- Effective dust control between production zones
- Robotic cleaning for consistent, autonomous floor maintenance
- Consistent hygiene standards throughout the facility

Suggested Nilfisk solutions

Scrubber dryers such as the **Nilfisk SC550**

Robotic cleaning solutions such as the **Nilfisk SC25**

HOW TO FIND THE RIGHT VACUUM

Important factors when choosing a vacuum solution for pharmaceutical production

Equipment for pharmaceutical production must be built to exacting standards and include features that go well beyond what other industries require. Here's what to look for.

Filtration

Upstream HEPA filtration as a secondary stage filter protects both operators and the motor's internal components from fine particles. Downstream ULPA filtration ensures exhaust air meets the strictest cleanliness standards. For the most demanding applications involving highly potent compounds, cyclone separation combined with multi-level filtration provides the highest level of particulate capture, exponentially reducing the quantity of particles reaching each successive stage.

Certifications and compliance

GMP and ISO compliance form the foundation of a compliant solution. Where combustible dust is present, ATEX or ACD certification is essential. For containment applications, OEB-rated equipment with third-party SMEPAC certification delivers documented proof of performance, while comprehensive validation packages support site IQ/OQ qualification.

Containment

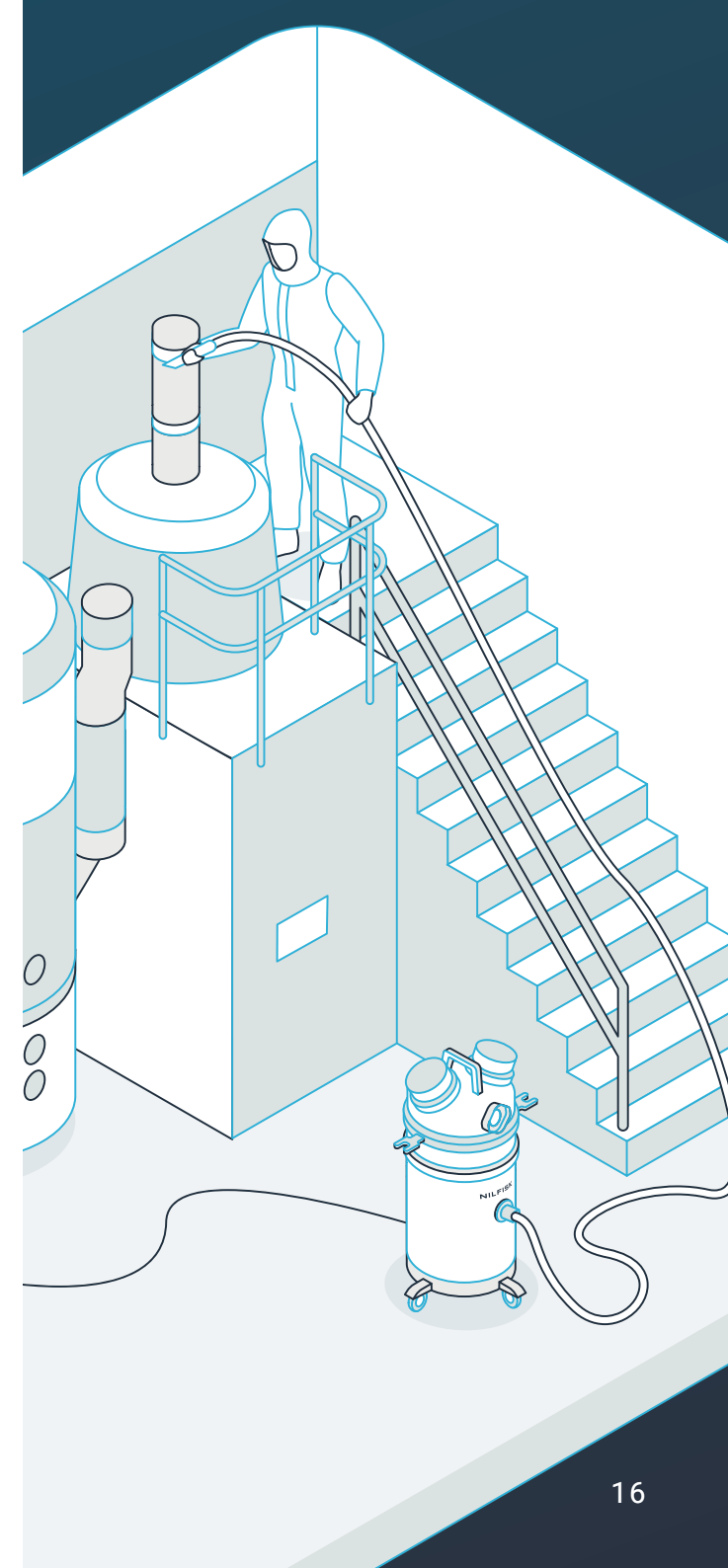
Look for solutions rated to your OEB classification, with bag-in-bag-out (BIBO) filter replacement and safe disposal systems that eliminate contamination and prevent exposing toxic materials to operators, the process, or the environment. Autoclavable containers and pharma-certified accessories maintain hygiene standards across the full cleaning cycle.

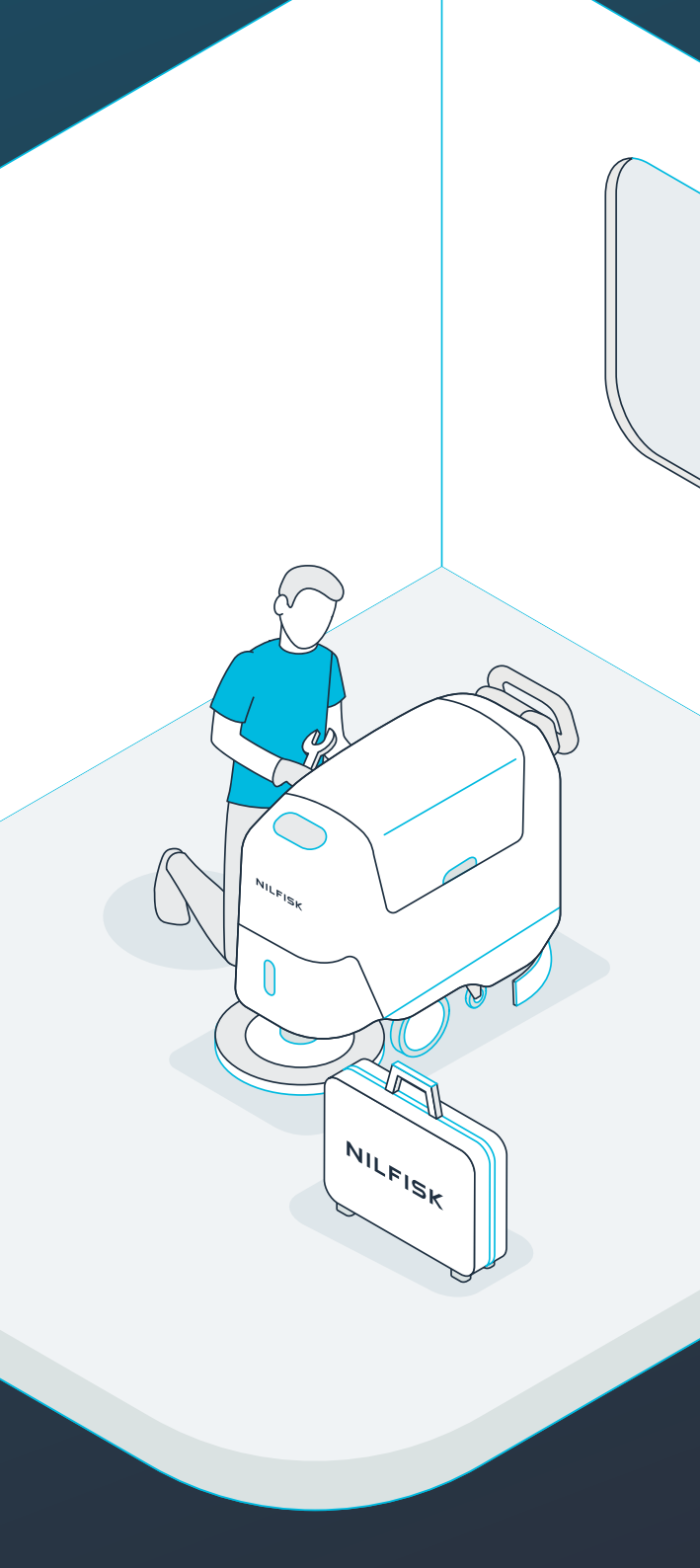
Design and maintenance

GMP-compliant materials — including AISI316L stainless steel, mirror polished — ensure your equipment meets the highest pharmaceutical hygiene standards. Tool-free disassembly, easy-access filters, and automatic filter cleaning minimize downtime between batches.

Conveying

Gentle, low-stress conveying preserves the integrity of sensitive materials such as granules and capsules. Process connectivity — including start/stop and alarm integration — allows seamless interaction with production equipment.





KEEP YOUR EQUIPMENT IN PEAK CONDITION

Nilfisk service — built for pharma

In pharmaceutical production, equipment downtime is never just an inconvenience. An unplanned stoppage can mean a delayed batch, a failed audit, or a missed delivery commitment. Keeping your vacuum solutions performing at their best is as important as choosing the right ones in the first place.

Nilfisk offers a comprehensive service program designed specifically for the demands of pharmaceutical environments — helping you maintain compliance, extend equipment life, and keep your production running without interruption.

Service agreements

Planned, regular maintenance by Nilfisk-certified technicians keeps your equipment performing to specification and prevents issues before they become stoppages. Our service agreements are tailored to your facility's needs — covering everything from filter changes and component inspection to full equipment assessment.

ATEX certification renewal

For ATEX-certified vacuums, maintenance isn't optional — it's a regulatory requirement. Planned service interventions are required to maintain the validity of the Declaration of Conformity. If maintenance is neglected, the certification lapses. Our service teams ensure your ATEX equipment stays compliant, keeping your facility safe and your documentation up to date.

Maintenance and repair

Our global network of trained Nilfisk technicians provides fast, reliable support when you need it. From routine filter replacements to more complex repairs, we help minimize downtime and maximize the return on your equipment investment.

End-to-end consulting

We support your team at every step, from identifying the right solutions for your facility to hands-on product walk-throughs with HSE managers, technicians and operators. The goal is always the same: optimized cleaning outcomes, fewer errors, and full compliance with your facility's standard operating procedures.

Ready to protect your product, your
people, and your production?

**Contact your local Nilfisk representative to
discuss a service agreement for your facility**

Contact us