PPE intelligence
translating process into facility
powered by DORR

Advanced Industries & Logistics

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THE CHALLENGE WE ALL FACE

Planning and delivering facilities in regulated industries requires turning strict compliance frameworks into a strategic advantage. Clear standards, intelligent design, and digital tools such as flow-optimized layouts, material-flow simulations, and digital twins enable traceable, validation-ready decisions from the start. Digital engineering, modular concepts, and scenario-based planning accelerate execution and ensure compliance from day one, creating reliable and future-proof operations. Designing a factory in highly regulated environments like **pharmaceuticals, food & nutrition, cosmetics or defense** is demanding. Strict hygiene, safety, and traceability requirements increase complexity, and even small deviations in layouts or material and personnel flows can lead to costly redesigns, project delays, or critical audit findings.

Fig. 1: Managing complex processes for next-gen solutions

PHARMACEUTICALS & BIOTECHNOLOGY

Factory planning in pharma and biotech requires deep knowledge of regulatory frameworks, contamination-control principles, documentation standards, and validated-facility life cycles. Cleanroom classes, GMP logic, segregation strategies, and traceable, audit-ready infrastructures remain essential. EU GMP Annex 1 is central, defining CCS, QRM, environmental monitoring, and airflow protection. PIC/S Annex 1 and FDA aseptic-processing guidance further specify sterile-manufacturing requirements, cleanroom behavior, first-air protection, and contamination-control measures to ensure compliant, inspection-ready facilities.

FOOD & COSMETICS INDUSTRIES

Food and cosmetics facilities must comply with a dense set of hygiene and safety regulations. Standards such as HACCP, GMP, ISO 22000, IFS Food/HPC, and ISO 22716 define rigorous expectations for hygienic design, material flow, cross-contamination prevention, and environmental control. These requirements demand precise planning to consistently safeguard product quality and consumer safety.

DEFENSE & SECURITY-RELATED INDUSTRIES

Planning facilities for defense and security applications means operating under some of the strictest industrial regulations. Export-control rules and security standards require protected zones, controlled access, transparent material tracking, and fully documented procedures. Frameworks like ITAR and NATO AQAP shape planning decisions and define requirements for classified workflows and secure material handling. Every layout and logistics flow must reinforce security, compliance, traceability, and tamper-resistance to keep sensitive operations protected, auditable, and aligned with regulatory expectations.

PPE INTELLIGENCE MAKES COMPLIANCE COMPETITIVE

When regulations are integrated from the beginning, they become a catalyst rather than a constraint. At PPE intelligence, we use clear industry standards to enable predictable planning, smoother validation, and audit-ready structures. This clarity supports modular layouts, digital workflows, automation, and scalable production concepts without compromising compliance. By embedding requirements directly into factory and logistics planning, strict rules become strategic levers for efficiency, transparency, and long-term resilience. The result: future-ready facilities that operate reliably today and adapt to tomorrow's technologies.

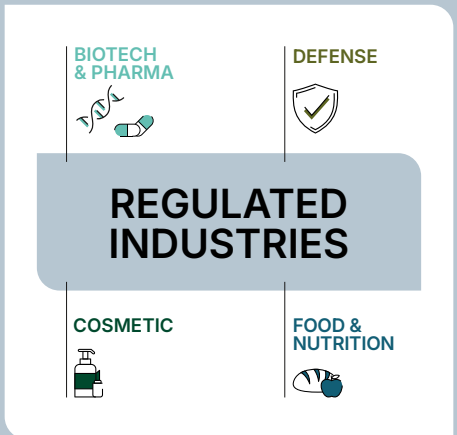


Fig. 2: Industries characterized by the highest compliance & quality standards

OUR AREAS OF EXPERTISE

- Biotech & Pharma
- Research & Laboratory
- Advanced Industries & Logistics

PPE intelligence is a multidisciplinary consulting and engineering firm combining Process Engineering with Facility Design & Delivery. At our core, we translate complex operational processes – whether highly regulated or not – into built environments. This conviction defines our identity and is captured in our guiding principle:
Translating Process into Facility.

Fig. 3: Our areas of expertise

WHAT'S IN IT FOR YOU
PPE intelligence delivers integrated, cross-disciplinary factory planning that transforms complex requirements into scalable, future-ready facilities.

INTEGRATED EXPERTISE FROM A SINGLE PARTNER

PPE intelligence combines deep process understanding with a holistic, GMP-driven service portfolio across Consulting & Front-End Design, Project and Engineering Management, Factory Planning & Logistics, Facility CSA, and Facility MEP. Fully integrated disciplines enable us to translate complex production requirements in regulated industries into compliant, scalable, and future-ready facility concepts from day one.

As part of the PORR Group, PPE intelligence pairs its interdisciplinary engineering and regulatory expertise with the execution strength, procurement power, and construction capabilities of one of Europe's major contractors. We develop process- and compliance-driven designs, while PORR Group ensures reliable delivery in execution covering the full spectrum from EPC (Engineering, Procurement & Construction) to EPCM(V). Where we orchestrate engineering, validation and compliance, and PORR Group provides structured site execution, cost certainty, subcontractor management, and schedule discipline.

This integrated model minimizes interface risks, shortens decision paths, and creates a seamless transition from concept to construction. The result: predictable delivery, audit-ready facilities, and a single aligned partner capable of driving regulated projects from first idea to fully operational handover.

Together, PPE intelligence and PORR Group provide seamless delivery from design to EPCM(V) execution.

EXCELLENCE IN HIGH PERFORMANCE FACTORY PLANNING!

Holistic factory planning is essential in highly regulated environments, where every design decision must be aligned across disciplines, life cycle-oriented, and fully embedded in a coherent planning logic. Instead of optimizing isolated elements, a holistic approach synchronizes processes, spaces, technology, and operational workflows into one integrated facility vision.

END-TO-END PROCESS DESIGN

A clear structuring of manufacturing flows, functional interfaces, zoning logic, and clean operational sequences forms the backbone of any compliant and efficient facility. It ensures the building supports the process – not vice versa.

SPATIAL & BUILDING DESIGN

A well-defined spatial concept provides clarity, scalability, and robustness. This includes early definition of room structures, functional clusters, expansion corridors, and design principles that support long-term adaptability.

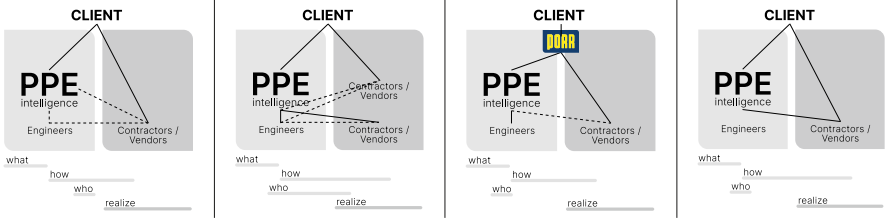
OUR DELIVERY OPTIONS

E
Engineering

AGILE EPCM(V)
Agile Engineering, Procurement, Construction Mgmt, Validation

EPC
Engineering, Procurement, Construction

IPD
Integrated Project Delivery



— Direct contractual relationship | --- Organizational lead relationship

Fig. 4: Our delivery options

CROSS-DISCIPLINARY INTEGRATION

Architecture, technical building systems, process equipment strategies, automation concepts, and operational requirements must be aligned from day one. This reduces interface friction, mitigates redesign loops, and increases planning predictability.

LIFE CYCLE-ORIENTED CONCEPT DEVELOPMENT

A holistic factory design considers operation, maintenance, flexibility, and future technology integration right from the early phases. This ensures long-term resilience, reliability, and strategic readiness.

DESIGNING YOUR END-TO-END LOGISTICS

Holistic logistics planning is a core pillar of high-performance production facilities in regulated industries. It aligns material flows, technology, storage concepts, and operational methods into one integrated logic that ensures transparency, stability, and seamless interaction with the manufacturing process. Instead of treating logistics as a downstream add-on, this approach embeds all logistics functions from the earliest planning phases to create a resilient and future-ready supply chain inside the facility.

END-TO-END MATERIAL FLOW DESIGN

A complete mapping of inbound, internal, and outbound flows defines how materials, components, consumables, and waste move through the facility. Clear flow logic minimizes interfaces, reduces handling steps, and creates predictable operational patterns.

ZONING AND FUNCTIONAL SEGMENTATION

Strategic separation of storage, handling, dispatch, and replenishment areas ensures clean, safe, and conflict-free movement of goods. These zones form the backbone of stable daily operations and enable smooth orchestration across shifts and functions.

STORAGE & BUFFERING CONCEPTS

Holistic planning defines the right balance between central and decentralized storage, buffer strategies, and inventory placement. Well-structured storage logic reduces reaction time, stabilizes production rhythms, and supports future automation.

Fig. 5: Automated solutions in advanced industries

AUTOMATED AND SEMI-AUTOMATED LOGISTICS SOLUTIONS

Automated and semi-automated systems create stable, predictable, and low-touch material movements inside the facility. Technologies such as AGVs, conveyors, shuttle systems, and automated storage modules reduce manual effort, standardize handling tasks, and support consistent cycle times. A holistic approach ensures these systems are not viewed as isolated tools, but as interconnected elements of the overall logistics architecture. This includes defining routing logic, interface points, equipment interaction, and operational integration. Semi-automated solutions add flexibility and allow phased modernization without disrupting daily operations.

INTERNAL TRANSPORT & HANDLING STRATEGY

A unified Internal Transport & Handling Strategy ensures consistent, efficient, and controlled material movement across the facility. Standardized transport modes, routing rules, and clearly defined handover points increase transparency and minimize bottlenecks. The strategy also covers trolley concepts, container standards, and appropriate material-handling equipment to support predictable, ergonomic, and GMP-compliant operations. A focused handling concept outlines how materials are picked up, moved, and transferred, ensuring safe, traceable flows while reducing manual effort. This strengthens process stability and supports reliable cycle times.

DIGITAL VISIBILITY & COORDINATION

Data-driven planning tools, logistics simulation models, and digital twins create transparency across flows and capacities. They enable proactive scenario testing and support reliable planning decisions throughout the facility life cycle.

LIFE CYCLE-READY LOGISTICS INFRASTRUCTURE

Holistic logistics planning accounts for future volume changes, product variations, and technology upgrades. This makes the internal supply chain adaptable, scalable, and resilient across decades of operation.

Fig. 8: Storage concept for cold-chain material

Holistic logistics planning creates an integrated flow system that stabilizes material movement and provides an efficient, future-ready backbone for the facility.

THE PPE INTELLIGENCE PROJECT METHOD DESIGNED TO DELIVER

An end-to-end project method ensures that factory and logistics concepts in regulated environments are clear, coordinated, and built for long-term performance. By integrating process logic, spatial design, technical systems, workflows, and operational requirements from the start, projects gain a strong and predictable foundation. The approach relies on structured iteration and modular principles to build flexible, scalable systems supported by transparent flow logic and well-aligned design elements. This creates robust, adaptable facilities that deliver stability today and remain ready for tomorrow's operational demands.

Fig. 6: Storage solutions fit for purpose

USP FACTORY PLANNING & LOGISTICS

Experience with Highly Complex Process Equipment

- Process equipment
- Highly automated lines
- Cleanroom equipment
- Thermal & hygienic processes
- Media supply & HVAC dependencies

Special Expertise in Handling Critical Products

- Material & personnel flow under temperature restrictions
- Monitoring & redundancy concepts
- Toxic, highly active, sterile, and biological substances
- Special rooms: ATEX zones, high-containment, cleanrooms

Simulation as a Binding Basis for Decisions

We use material flow & production simulations to:

- Precisely determine capacities
- Identify bottlenecks
- Justify investments
- Demonstrate process stability

Smooth Implementation

- Installation
- Commissioning
- Ramp-up
- FAT/SAT
- GMP-compliant documentation

Fig. 7: Our strategic differentiator: The USPs of factory planning & logistics

Fig. 9: The PPE intelligence method delivers from design to EPCM(V)

PHASE 1: DEFINING SCOPE & REQUIREMENTS

Every regulated project starts with a clear definition of scope and operational expectations, covering functions, performance, compliance, cleanliness strategies, automation depth, and risks. The result is a concise, cross-functional requirement specification aligned with Quality, Operations, Engineering, R&D, and Regulatory teams.

PHASE 2: THE FRONT-END PLANNING & CAPACITY ANALYZE

This phase translates the defined requirements into a cohesive operational concept. It includes process-flow development, zoning strategies based on risk and cleanliness classes, structured risk assessments, and the creation of process concepts supported by process design, analysis, and capacity calculations. Integrated steps such as layout development, material-flow logic, and logistics planning align process efficiency and equipment needs. Dynamic capacity modeling and early optimization lead to a functional conceptual design that meets regulatory expectations and forms a solid basis for detailed engineering.

PHASE 3: DETAIL DESIGN & ENGINEERING

Detailed engineering defines precise layouts, selects compliant equipment, and embeds design-for-cleaning and inspection principles. Utilities, automation strategies, simulations, and digital twins ensure safe, efficient, compliant operation in regulated environments.

PHASE 4: TENDERING & SUPPLIER COORDINATION

Supplier selection requires audits, compliance verification, and proof of standard-conform equipment. Qualification readiness and adherence to design guidelines ensure all partners meet regulatory project requirements.

PHASE 5: CONSTRUCTION, INSTALLATION & COMMISSIONING

Execution covers controlled construction, equipment installation, and FAT/SAT/IQ/OQ/PQ qualification. Utilities and cleaning are verified, ensuring stable system performance before entering the regulated environment.

PHASE 6: HANDOVER TO OPERATIONS & RAMP-UP

The final phase secures operational readiness through training, KPI monitoring, and process stabilization, while documentation checks and audits confirm full regulatory compliance.

Clear interfaces, aligned workflows, and validated processes ensure stable delivery and enable a smooth, agile transition from design to full operations.

OUR ENGINEERING TOOLKIT

Process Toolkit

Process design, detailed analyses, capacity modeling, and lean methods form the foundation of stable, efficient, and GMP-compliant production processes. They enable early optimization, clear workflows, and reliable technical decisions in all early planning phases.

Digital Engineering Toolkit

BIM models, simulations, digital twins, and the PPE.bot enable transparent planning, faster decision-making, and consistent, audit-ready project documentation throughout all phases.

Facility & Layout Toolkit

Optimized layout structures, risk-based zoning, functional facility concepts, and integrated MEP/utility planning align GMP requirements with efficient architecture. This results in flexible, scalable, and validation-ready facility designs that support long-term operational stability.

Logistics Toolkit

End-to-end material-flow design, storage and buffering concepts, transport strategies, and simulations provide stable, scalable, and automation-ready intralogistics for regulated production environments.

Regulatory Toolkit

GMP integration, risk assessments, compliance frameworks, and audit-ready documentation ensure that planning, decisions, and processes remain fully compliant and inspection-ready at all times.

Fig. 10: Precision-driven pharmaceutical manufacturing

NICE TO KNOW

PPE intelligence is an independent consulting and engineering company within the PORR Group. We focus on biotech & pharma, research & laboratory, as well as logistics & advanced factory planning. The PORR Group employs around 21,000 people, including more than 1,000 engineers.
Together, we combine **Engineering Agility** with **PORR Stability**.

Our monthly Tech Sheet