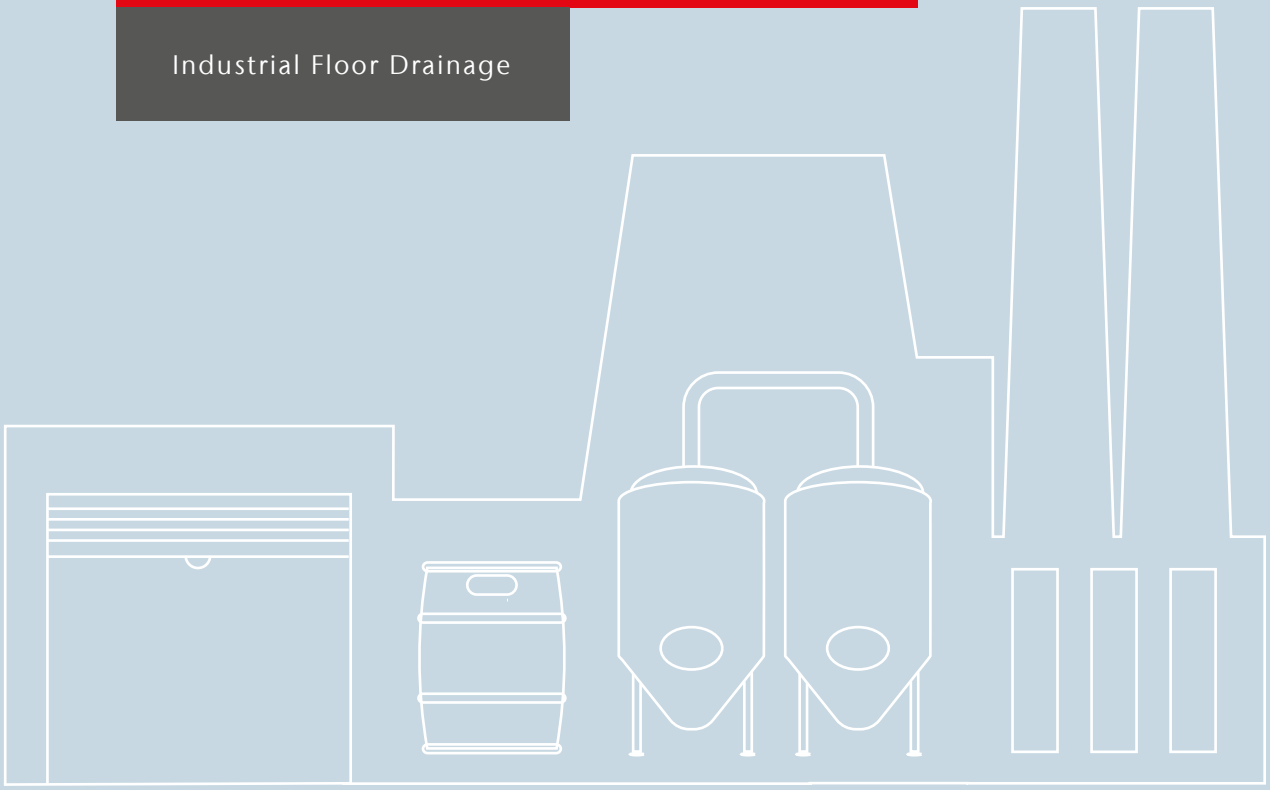
Successful Drainage Design Project Checklist

Industrial Floor Drainage



Drainage: A Critical but Often Overlooked Component

In production environments, drainage systems are often out of sight and, unfortunately, out of mind. At best, this oversight leads to costly, ongoing cleaning and maintenance. At worst, it can result in serious food contamination.

The design of drainage systems and their individual components significantly impacts hygiene, operational efficiency, and maintenance costs.

At ACO, we understand the vital role that drainage plays in commercial food preparation. That's why we design drainage systems specifically to protect food and beverage production environments. Our commitment is to protect the production environment and save the most valuable resource – water. That all while maintaining the uncompromised hygienic standard.

Pre-Requisites for Optimal Drainage Performance in Food & Beverage Production

To ensure hygienic and safe operations, a well-designed drainage system must include:

- ☑ A layout that aligns with process and technology requirements
- ☑ Sufficient retention capacity
- ☑ High cleaning performance
- ☑ Good integration with the floor
- ☑ A layout that respects health and workplace safety

Successful Drainage Design Project Checklist

Industrial Floor Drainage

Welcome to the Successful Drainage Design Project Checklist.

This guide is a deep dive in the function and design of building drainage systems and prepares you to have productive and focused discussions with people responsible for the project and the final production environment.

The guide explains what information you need to collect to understand the needs of the area to be drained and to choose the best drainage solution. It covers eight key areas, including the type of industry, technology used, liquid quantity and quality, floor integration, traffic, and cleaning. The sample questions at the end of each section that can help you plan the drainage projects in the best way.

Whether you are starting a new project, checking an existing plan, or upgrading an old system, this guide will help you make better decisions to design a drainage system that contributes to a safe production environment.

How to work with this Guide?

At the very beginning of the project

In the project preparation phase, decisions are made on scheduled investments and spendings. In this stage it is important to understand the responsibilities of different entities involved in the project.

It is not unusual for the planners to “copy & paste” the already existing project that may not correspond to the requirements of the future production environment leading to problems that slow down or even stop production for some time due to inefficient drainage.

You can demonstrate your drainage competence by being involved in the project specification and supporting project documentation/drawing development.

Refurbishing of the existing area

These situations include:

- Installing new technology for the same type of production, production capacity increase
- Installing new technology for new products (new production process, production capacity increase)
- Changing the original purpose of the facility, e.g. from a warehouse to a production or packaging area, etc.

When refurbishing a production area while keeping the original drainage system layout, several issues can arise. The existing drainage may not align with new equipment or workflow changes, leading to inefficient water flow, pooling, and potential contamination. Additionally, outdated drainage may not meet current hygiene and safety standards, increasing the risk of bacterial growth, odors, and structural damage over time.

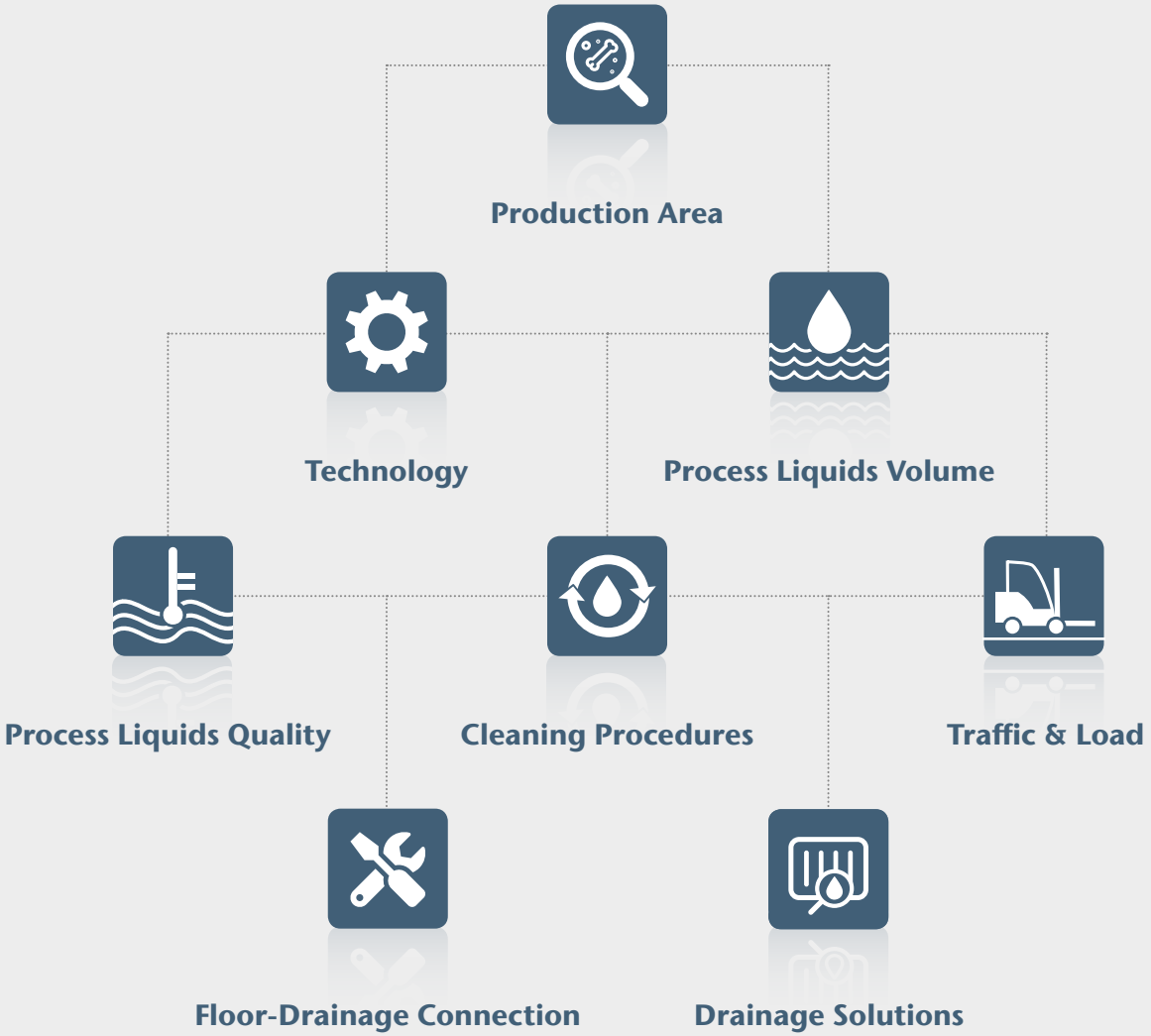
You can demonstrate your drainage expertise by suggesting drainage optimization according to the current project and by offering project documentation check.

Project validation

The project plan and project documentation already exist. You can demonstrate your drainage expertise by getting involved in the project documentation verification & optimization proposal.

Project documentation to support your understanding:

- facility master plan
- floor structure drawing
- technology layout plan



Industry / Production Type

What industry?

Why it is important?

The initial information about the type of the project is important for further planning of your steps.

The project documentation such as the master plan contributes to the understanding of the layout of the facility including the technology installed and the direction of the production process flow.

It can also provide you with the information about machinery operator's movements in the area.

Questions include:

- What type of industry is it?
- Which stage the project is at?
- What type of production? What exactly do they produce?
- What part of the production process is covered by the project?
- What technology is installed? What type of machines?
- Masterplan: does it exist, is it up-to-date?
- What is cleaning process of the area (wet, controlled wet)?

Production Area/ Zone

PRODUCTION AREA

Where is it?

Why it is important?

The information about the area where the drainage system is going to installed includes the information about hygienic requirements, the flow of the material to be processed, the number of outlets to be specified, etc.

The requirement for waste water flow direction is **always** from high care to low care areas to prevent product contamination by allergens or dangerous microorganisms.

The requirement for recycling of the drained liquids when the water is re-used again in another part of the production process has an impact on the drainage design when two separate systems must be installed.

The drainage system design can be influenced e.g. by the number of outlets already pre-defined, in case there are not enough outlets specified, the channels should be deeper as a buffer in a period of time.

The flow of the material can represent an additional source of water, e.g. when spilt on the floor.

Questions include:

- What part of production is it? How's water involved?
- What are the hygienic requirements / safety regulations applied in the area?
- What processing zone is it?
- Where exactly the drainage will be placed (physically) in the building?
- How is it going to be connected with the already existing system?
- Where does the waste water go from here (e.g. to neutralization or buffer tank, public sewerage, waste water treatment plant)?
- Do you consider recycling of drained liquids? – What and where?
- Are outlets already specified? Where? How many? What are the dimensions?

Technology

What technology?

TECHNOLOGY

Why it is important?

The information about the technology and its layout contributes to effective design of the drainage system. For example, if there is more than one source of water coming from the machine, they can be directed to one drainage point only.

The drainage should be located as close as possible to the waste water source (outlet valves) to eliminate or at least minimize water flow on the floor. At the same time, the drainage should be free to access for cleaning and inspection.

The pipe connection of the production tank to drainage system must be designed with a sufficient air gap to prevent waste water flooding the floor or being sucked back intro the production tank or cleaning system (CIP).

The peak discharge and the regular discharge of the liquids can differ significantly, depending on the operations procedures of the processing environment. For example, the technology producer can state that the regular discharge of a tank is 38l/hour. In reality, the way the tank is discharged is 15l/s in 5 minutes.

It is good to know where the operating panel/ area of the production unit is located. The drainage shall be designed the way so that the machine operators do not stand in the water or on the grates permanently.

Questions include:

- What technology is/will be installed?
- Where are the technology outlets?
- What is the regular discharge of water/ liquids?
- Where does the operator stand/move when operating the machine?
- Where are the traffic routes?

Process Liquids Volume

What goes in the drains?

PROCESS LIQUIDS VOLUME

Why it is important?

The information on the quantity and quality of the liquids going in the drainage system contributes to the effective drainage design and it can support the argumentation for stainless steel drainage system as a whole.

Similarly, information about the volume and maximum flow coming from the machines influences directly the drainage design.

The peak discharge and the regular discharge of the liquids can differ significantly, depending on the operations procedures of the processing environment. For example, the technology producer can state that the regular discharge of a tank is 38l/hour. In reality, the way the tank is discharged is 15l/s in 5 minutes.

In case there are not enough outlets specified, the channels should be deeper as a buffer in a period of time.

Dry production such as bakery where minimum or no water is present at the production floor during the operations requires closed drainage outlets.

Questions include:

- What are the sources of liquids and where exactly are the drains?
- What is peak/max flow volume (l/s) how frequently and for how long time?
- How many outlets do discharge such volume?

Process Liquids Quality

PROCESS LIQUIDS QUALITY

Why it is important?

Stainless steel is the best material preventing thermal shocks impacting drainage systems. For example, the cleaning in place process (CIP) discharge the water 80 – 95°C hot. Crate washers can discharge water over 80°C with the outlet directly in the drain.

Plastic pipes placed directly right after the channel cannot withstand **repeating hot & cold water cycles** and their durability gets compromised. This can lead to unwanted leakage into the floor structure that may result in caverns.

The information about the substances contained in the liquids drained can influence e.g. the silt/debris basket capacity. The foaming substance slows down the water flow and requires bigger retention capacity.

Knowledge of chemicals used during the production process and contained in cleaning liquids is crucial for drainage systems. It supports the argument for S/S 316 (chlorides).

Majority of accidents come from slippery floor due to grease or oil spilt on the floor. This can give you indication on the required roughness of grates.

Questions include:

- What is the temperature of water/liquids to be drained? (both processing & cleaning liquids)
- What are the substances in the waste water (grease, oil, chemicals)? What is their volume?
- What particles (production debris, glass, plastics) – go in the drain/ are left on the floor?
- What is the roughness of the floor?

Cleaning Procedures

CLEANING PROCEDURES

Why it is important?

Cleaning represents important source of water to be drained and calculated with when designing the capacity of the drainage system.

Some cleaning procedures, such as foaming require bigger channel capacity.

Some detergents may chance their substance depending on their temperature – e.g. from liquid to gel, increasing the requirements for drainage capacity.

Questions include:

- What is cleaning process of the area (wet, controlled wet)?
- What is the "regime" – production vs. cleaning? What is the frequency and time of each period?
- What's the acidity of detergents?
- Do detergents create foam?
- What is the temperature of cleaning liquids?

Traffic & Load

What goes over the drainage?

Why it is important?

Traffic around the drainage system is an important factor to consider. It has implications to grating specification.

Where possible, the drainage should be designed away from transportation and walkways. If this is unavoidable, for example when drainage element is used to create a barrier between individual areas/zones, the impact of the dynamic forces on grates shall be considered, and the length of the drainage crossing of these corridors should be minimized.

The channel gratings or covers that enable smooth passage across these areas and provide sufficient load bearing capacity should be used.

Questions regarding irregular traffic in the area are also practical, for example, you may find that during the maintenance breaks trucks may go to in areas that are normally designed for light traffic only.

Questions include:

- What traffic goes over the drainage?
  – pedestrian, traffic area
- What is the regular traffic?
- What is the irregular traffic, such as maintenance, technology installation, etc.?
- What type of vehicles?
- What load do they carry?
- What type of wheels do the vehicles have?
  – solid, pneu, plastic, steel, size of wheels?

Floor-Drainage Connection

How is the drain integrated into the floor?

FLOOR-DRAINAGE CONNECTION

Why it is important?

Thermal and dynamic loads at the floor-drainage joints require different ways of drainage installation.

Depending on whether it is dynamic load or both thermal and dynamic loads at the connection you should consider standard edge connection with a flexible joint or a special reinforced L shape connection.

Majority of accidents in food industry comes from slippery floors. Floor and grating slip resistance should match each other to minimize the risk of accidents.

Questions include:

- What type of floor is (will be) installed? (Concrete, resin, tiles...)
- Does a floor structure drawing exist?
  – Slab height, Floor/ceiling height, waterproof membrane
- Are outlets specified? How many? Where? Existing-planned?
- What pipes are used – diameter, adaptors? Total outlet capacity?
- What's left on the floor during processing? (grease, oil, solid particles (glass, plastic, bones, etc.)
- What's the required slip resistance of the area?
- What's the slip resistance of the floor? (R 9 – R13)
- What's the temperature of water on the floor?

Drainage Solutions

What else?

DRAINAGE SOLUTIONS

Why it is important?

Getting information about additional areas that could be included in the project ensures a more comprehensive and future-proof solution for your customer.

It helps identify potential improvements that may enhance efficiency, safety, and compliance while avoiding costly modifications later.

Businesses can maximize their investment and create a more adaptable, high-performing production environment.

ACO has a proven expertise in designing and delivering both building drainage and surface water management systems.

Questions include:

- How is it going to be connected to other drainage elements /in other areas of the building?
- What pipework do you use? What material? Why? What size?
- Where does the waste water go from here (e.g. To neutralization or buffer tank, public sewerage, waste water treatment plant?
- What other areas shall be considered to manage the waste water inside the building? How about outside the building – parking, loading/unloading area?
- How do you have grease management arranged?
- Who will be installing the drainage? Technically? SOP?
- Would you be interested in project supervision? Material handover? Welding on site?

ACO Design and Support Services

A Comprehensive, Professional Approach to Every Project

At ACO, we offer a range of expert design and support services to ensure our customers benefit from high-performing, durable drainage systems that meet the demands of their specific production environments.

Our support services start at planning new drainage layouts and optimizing existing designs to providing BIM data, on-site system assembly, and precision welding.

Our team of professionals is ready to assess your current drainage performance, identify potential risks related to hygiene, operation, and safety, and develop a structured corrective action plan.

We ensure that your drainage system aligns with your production technology, traffic flow, and operational needs—supporting both efficiency and workplace safety.

askACO

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Intelligent drainage systems from ACO increasingly use smart technology to ensure that rainwater and wastewater are drained, or temporarily stored. With innovative separation and filter technology, we prevent water contamination. We accept the challenge of reusing water, and thus establishing a resource-saving cycle.

ACO. we care for water

04/2025 – Subject to change.