JUMBO BLOCK® Digital Planning & Infrastructure Suite

The **JUMBO BLOCK® Digital Planning & Infrastructure Suite** combines planning, simulation, and infrastructure monitoring in an integrated digital toolset.

The digital tools support planners, municipalities, and infrastructure operators during different phases of a project – from the initial concept idea to the operation of a system.

The suite has been designed to address both the **physical requirements of modern infrastructure planning** and the **digital requirements for traceability, documentation, and system security**.

The system architecture therefore aligns with current European frameworks for critical infrastructure, in particular:

- **KRITIS** – Protection of critical infrastructures
- **NIS-2 Directive** – Cybersecurity and traceability of digital systems
- **CRA (Cyber Resilience Act)** – Security requirements for digital products and systems

The combination of planning tools and digital monitoring enables **transparent documentation of infrastructure measures** and supports modern requirements for **resilient and verifiable infrastructure**.

JUMBO BLOCK® Plan

The **JUMBO BLOCK® Plan Tool** enables the geometric and structural pre-planning of modular JUMBO BLOCK® systems.

With only a few inputs it is possible to calculate:

- number of required modules
- total retention volume of the system
- required components (base plates, side plates, cover plates)
- material requirements
- system layout

The tool provides the basis for an **initial technical project assessment**.

JUMBO BLOCK® Hydro

The **JUMBO BLOCK® Hydro Tool** supports the **hydrological pre-planning** of rainfall events and retention systems.

Based on:

- rainfall intensities
- catchment areas
- return periods

it can determine:

- required retention volume
- number of required JUMBO BLOCK® modules
- possible system capacities

The Hydro Tool therefore complements geometric planning with **hydrological system dimensioning**.

JUMBO BLOCK® Dashboard

The **JUMBO BLOCK® Dashboard** represents the digital layer of the infrastructure.

By connecting **IoT sensors**, the system can monitor for example:

- water levels
- system status
- operational data of the installation

Data can additionally be documented using **verifiable logging systems and distributed-ledger technology (IOTA)**.

This enables **transparent and traceable infrastructure monitoring**.

One System – Three Tools

The three digital tools together provide continuous support for modern infrastructure projects.

Phase	Tool
Concept & preliminary planning	**JUMBO BLOCK® Plan**
Hydrological dimensioning	**JUMBO BLOCK® Hydro**
Operation & monitoring	**JUMBO BLOCK® Dashboard**

Together they form the **digital planning and operational layer for JUMBO BLOCK® retention infrastructure**.

System Principle of the JUMBO BLOCK® System

The JUMBO BLOCK® system is a modular underground storage system for **rainwater retention beneath traffic areas**.

The installation consists of standardized **JUMBO BLOCK® hollow modules**, installed underground and complemented by **base plates, side plates, and cover plates**.

The modules are installed **block-to-block on a single level**, forming a large underground storage reservoir.

The system can be installed beneath:

- roads
- parking areas
- public squares
- industrial surfaces

Depending on the system concept, the stored rainwater can:

- be **temporarily retained (retention system)**
- **infiltrate into the surrounding soil (infiltration system)**
- be **released with a time delay**

Due to the modular structure, the overall system size can be **virtually unlimited**, as it depends solely on the **number of installed modules**.

Manual

JUMBO BLOCK® Plan

Purpose of the Plan Tool

The **JUMBO BLOCK® Plan Tool** enables rapid **geometric and structural preliminary planning** of modular JUMBO BLOCK® systems.

With only a few inputs, planners, municipalities, and engineering offices can:

- determine the required number of **JUMBO BLOCK® modules**
- calculate the **storage volume of the system**
- determine required components (base plates, side plates, cover plates)
- estimate **material requirements**
- visualize the **system layout**

For **hydrological planning of rainfall events and retention volumes**, the additional tool **JUMBO BLOCK® Hydro** is available.

The Plan Tool therefore enables a **solid geometric and structural project assessment** as a basis for further planning.

1 Project Information

The **Project Information** section allows basic project data to be entered.

Typical information includes:

- project name
- location or site
- contact person
- additional project notes

This information appears later in the **project overview**, **print output**, and **PDF documentation**.

2 Planning Mode

The JUMBO BLOCK® Plan Tool offers two different planning approaches.

The planner can choose between:

- **Planning by target volume**
- **Planning by system dimensions**

Planning by Target Volume

In this method, the desired **retention volume** is defined first.

The tool then automatically calculates:

- required number of **JUMBO BLOCK® modules**
- required **installation area**
- required **components**

This method is particularly suitable for projects where a **specific retention volume is required**.

Planning by System Dimensions

In this method, the **available installation area** is defined first.

The tool then calculates:

- the possible **number of modules**
- the achievable **retention volume**
- required **material quantities**

This method is especially suitable for projects with **limited installation space**, such as beneath roads or public squares.

3 Manual Adjustment / Special Layout

The **Manual Adjustment / Special Layout** section allows further customization of the planning parameters.

This includes:

- adjustments of the system layout
- selection of the sealing concept
- selection of concrete classes for plate components

SABA Sealing Mode

The tool supports different sealing concepts.

Available options include:

Standard Sealing

The system is completely sealed so that stored rainwater remains inside the installation.

This corresponds to a typical **rainwater retention system**.

Infiltration Without Bonding

The system is installed without sealing, allowing stored water to **infiltrate into the surrounding soil**.

This option is used for **infiltration systems**.

Infiltration With Bonding

In this configuration, the components are partially bonded to ensure structural stability.

The tool assumes:

- **4 bonding strips per component connection**
- **strip width: 0.5 m**
- **total bonding length per component: 2 m**

An additional **material reserve of 15 %** is included.

Plate Concrete Classes

The tool provides an overview of possible **concrete classes for plate components**.

The standard class for:

- **JUMBO BLOCK® modules**
- **base plates**
- **side plates**
- **cover plates**

is: **C40/50**

For **traffic cover plates or protective covers**, higher concrete classes can be selected if higher loads are required.

4 Automatic Pre-Planning

The **Automatic Pre-Planning** function helps create an initial system concept quickly.

Based on the entered parameters, the tool calculates:

- number of modules
- retention volume
- installation area
- material requirements

5 System Layout

The **System Layout** provides a graphical representation of the planned installation.

The display shows:

- number of modules in **longitudinal direction**
- number of modules in **transverse direction**
- the spatial structure of the system

Each displayed block represents a **JUMBO BLOCK® module**.

6 Results Overview

The Results Overview summarizes the key planning results.

Displayed information includes:

- number of **JUMBO BLOCK® modules**
- total system volume
- required installation area
- component quantities

System Components

The tool automatically calculates:

- **base plates**
- **side plates**
- **cover plates**

Joint Sealing and Component Connections

The tool calculates required sealing or connection elements.

For **standard sealing**, joints between the following elements are considered:

- module connections
- base plates
- side plates
- cover plates

The tool calculates:

- **total joint length**
- **required sealing material**
- **15 % safety reserve**

As a reference system, **elastic joint sealing systems (e.g. SABA)** are considered.

7 Theoretical Reference Values

The tool additionally provides **theoretical material reference values** for concrete components.

These values relate to **compressive loads in concrete materials**.

Displayed values include:

- concrete class
- characteristic compressive strength **fck [MPa]**
- theoretical compressive loads for:
- base plates
- cover plates
- module columns

Calculations are based on defined **reference cross-sections**.

Example:

Base / cover plate

A = 2.245 × d

Module column

0.0625 m²

These values serve **only for technical orientation**.

They **do not represent structural verification**.

8 Print / PDF / Inquiry

Planning results can be documented and shared.

Available functions include:

- **print function**
- **PDF generation**
- **inquiry function**

This allows planning results to be easily shared with **project partners, authorities, or construction companies**.

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