Flexi-Drain — Manual

Parametric drainage run for Archicad · Version 0.65 · b-prisma · Status: 27 July 2026

01 Overview

Flexi-Drain is a parametric GDL object for complete drainage runs: underground and collection drains with gradient, branches, reducers, access openings, vertical offsets and a stack at the starting point — all in a single object, laid out directly in the floor plan.

What makes it special: at the highest level of detail the run is built as a chain of **real KG fittings** — pipes with socket and spigot in standard lengths, bends, branches, reducers and access fittings with catalog-verified dimensions from the Ostendorf KG catalog. What you see is what gets installed on site.

Important: Flexi-Drain requires the supplied macro and fitting library parts (`_kg_lookup`, `KG–Rohr`, `KG–Bogen`, `KG–Abzweig`, `KG–Reduzier`, `KG–Revision` and others). The supplied LCF file contains everything — load it via the Library Manager.

02 Quick start

- Place the object in the floor plan — a straight run with two points appears.
- Move the points using the **hotspots**; the midpoint hotspots insert additional intermediate points.
- Bend angles snap automatically to the standard angles **15° / 30° / 45° / 67.5° / 87°** (DIN 1986-100). Free angles can be enabled with the "Allow free angles" switch.
- Select system, nominal size and gradient in the settings dialog — done.

03 Pipe systems and nominal sizes

SYSTEM	STANDARD/MANUFACTURER	NOMINAL SIZES
HT-PP	DIN EN 1451-1	DN 32–150
PVC-U / KG	DIN EN 1401 (SN 4 / SN 8)	DN 100–300
Geberit Silent-db20	manufacturer catalog	DN 50–150
Wavin SiTech+	manufacturer catalog	DN 32–150
PP-MD / KG2000	DIN EN 14758-1	DN 100–300

Outside diameters and wall thicknesses come from a source-verified catalog per system (central data module `_kg_lookup`) — when the system is changed, pipe diameter and wall thickness change accordingly. For the KG system the ring stiffness class **SN 4 / SN 8** can also be selected. The **shape and installed lengths of the fittings** (sockets, bends, branches, reducers, access fittings), however, follow the KG range as per the Ostendorf catalog for all systems — manufacturer-specific fitting geometries (such as Geberit or Wavin mouldings) are not modeled.

04 Laying, gradient, pipe category

- **Gradient** as a percentage, flow direction "upwards/downwards" along the drawn path. Sockets automatically face against the flow direction (standard-compliant installation). Drops and the stack align with the flow direction (with "upwards" the stack sits at the high end and the drop steps upwards in flow direction).
- **Pipe category** (connection, stack, collection, underground drain) and **standards region** (DE/AT/CH): the object checks the minimum gradient and warns if it is not met.
- **Pipe purpose** (SW/RW/MW/drain) controls labeling and the 2D center line type.
- The level reference of the run is the **internal pipe invert**.

05 Levels of detail (LOD)

3D (tab "Layout"):

- **LOD 300 — pipe run:** continuous pipe with smooth bends (TUBE). Fast, for design and overview.
- **LOD 500 — fittings:** chain of real KG fittings with sockets, spigots, bends, branches, reducers and access fittings. Standard pipe length adjustable (factory setting 3 m); the last pipe of each segment is cut to length. Pipes, branches and reducers follow the **installation lengths of the Ostendorf KG catalog** (z dimensions per DN combination and angle); pipes connect flush to the fittings.

2D (independent of the 3D level of detail):

- **Polyline** — axis lines only, including branch lines (snappable via hotlines).
- **Profile** — pipe width as a double line, without fittings.
- **Profile with fittings** — floor plan projection of the fitting chain.

06 Branches (tab "Branches")

Up to 20 branches along the run:

- **Position** along the path — draggable directly at the sliding hotspot (2D and 3D).
- **Branch angle** ±45° / ±67.5° / ±87°; a negative sign means the opposite side. In 2D it can also be set via the angle hotspot.
- **Rotation about the pipe axis** (`Rotation`): freely adjustable — 0° = sideways, 45° = diagonally upwards, 90° = vertically upwards, 180° = other side. In 3D directly accessible via the **rotation handle** at the branch point.
- **Nominal size** of the branch freely selectable — the list only offers values up to the nominal size of the main run (a branch cannot technically be larger than the pipe it connects to).

In LOD 500 a real KG branch fitting sits at that position in the pipe chain; the intersection of the main pipe axis and the branch axis lies exactly on the set position.

07 Reducers (tab "Reducers")

Changes of nominal size along the run. The list of target sizes is filtered by flow direction: on a falling run only enlargements are permitted (widening in flow direction), on a rising run only reductions.

Position via sliding hotspot. In LOD 500 the KG reducer is rendered with an eccentric cone; the pipe inverts stay flush.

08 Access fittings (tab "Access")

Access fittings along the run. In LOD 500 as a real **KG access fitting (KGRE)** with screw cap and catalog installation length, opening upwards.

Position via sliding hotspot. The object warns if an access fitting is missing on long underground drain sections.

09 Drops (tab "Drops")

Up to 10 drops at any position along the path: position and drop height per drop, height draggable directly at the Z hotspot. The position marks the **upper knee point**; the horizontal space the offset needs is taken from the following section of the run — the drawn path remains unchanged.

Three **types** are available per drop (DIN 1986-100):

- **30° offset** (default): 30° bend – inclined intermediate pipe – 30° bend. The flattest, most flush-safe design; horizontal offset ≈ 1.73 × drop height.
- **45° offset:** as above, with 45° bends; horizontal offset = 1.0 × drop height.
- **vertical (manhole only):** 90° routing made from the 2×45° fitting and a plumb downpipe. Only permitted inside a manhole — the status line always says so. The **bottom termination** is selectable: "continue horizontally (2×45°)" for a continuous run, or "45° outlet (channel)" where the spigot tip ends at the lower axis level, discharging into the open manhole channel.

The drop height is automatically raised to the **minimum** if the chosen type could not be built

without collisions (two bends plus an intermediate pipe with socket and 10 cm visible length) — with a note in the status line. Further warnings: "drop manhole required" from 1 m drop height, and "following segment too short" if the offset would reach beyond the next knee point. The double level dimension (invert above/below) sits at the middle of the offset, and the parts list breaks each drop down into its fittings. The basic gradient of the run remains unaffected by the drop.

10 Stack (tab "Stack")

Optional vertical stack at the starting point (with flow direction "upwards" at the end point — always at the high end of the run):

- **Height** via parameter or Z hotspot; optional damping bend above an adjustable drop height.
- Up to 10 **stack branches** with height, nominal size, angle and rotation about the stack axis (floor connections). Each branch has its own sub-tab "Stack br.".
- Optional **vent cap** (right-hand column of the tab) with cylinder height, outside diameter, pitched sealing apron (for roof penetrations) and material.

In LOD 500 as a fitting chain: an 87° base bend runs into the first socket of the underground drain, above it pipes in standard length, stack branches as KG branches.

11 2D labeling and level dimensions (tab "Layout")

- **Pipe labeling** per segment, composed of: run number, purpose (SW/RW/MW/drain), DN, gradient, system, length — e.g. "L-01 | SW | DN100 | 2.0% | 12.500 m".
- **Level dimensions** (internal pipe invert) at start/end, offsets and branches; reference selectable: project origin, reference levels or sea level. Font, size, style and color follow the Archicad standard.
- **Center line** with purpose-dependent line type (SW/RW/MW/drain configurable separately).
- **Gradient arrow** in flow direction, switchable on the Layout page (only the triangle, the axis line runs continuously to the arrow tip); separate pen, optionally per segment.
- **Section development:** developed longitudinal section below the floor plan with chainage, invert profile, station symbols and level values — exaggeration adjustable.

Story-based 2D display (subpage "2D display")

Axis, outline and fill can be switched separately per story context — for **below home story**, **on home story** and **above home story** (only with story dependency enabled). Each pipe purpose (SW/RW/MW/drain) has its own axis line styles and pens, plus a contour pen for the pipe outline.

The **stack display** shows or hides the stack cross-section per story: on the home story as a circle symbol, on the story above as a sectioned, filled cross-section with the stack branch stubs in their actual rotation.

Projection with overhead across all stories

For a story-correct display across several floors there is the switch **"Projection with overhead across all stories"**. It uses Archicad's 3D projection with cut planes: on each story you see the **section** through the pipes running there, the **outlines** of elements below and the **overhead** of elements above. Ideal for stacks with floor connections — each story shows only the branch actually cut there.

Adjustable are the **floor plan display** (Projected, Projected with Overhead, Symbolic, Outlines Only, Overhead All), the **projection range**, a manual **cut plane height offset** as well as pen, line type and fill separately for outlines, section and overhead. When this mode is active it takes over outline and fill; the fields "Show outline", "Show fill" and "Show stack" are then hidden because the projection replaces them.

Fitting labels (subpage "Fitting labels")

Branches, transitions (reducers), drops and access fittings can optionally be labeled in shop drawing style — each type can be switched on individually:

CODE	ELEMENT	EXAMPLE TEXT
BR	Branch	`BR DN(OD) 110/ DN(OD) 125`
RD	Transition (reducer)	`RD DN(OD) 110/ DN(OD) 160`
DR	Drop	`DR h=0.30 m`
AC	Access fitting	`AC DN(OD) 110`

Diameters are given as outside diameters (OD) from the catalog, for branches and transitions with both sizes involved. Each text comes with an **underline** and a **pointer line** to the element — both switchable globally. Every text can be freely **moved and rotated** by hotspot; underline and pointer start move with it. The free **pointer end** has its own hotspot and can be dragged precisely onto the element. All adjustments are retained when the object is rebuilt.

12 Automatic docking (tab "Connections")

Flexi-Drain runs, the individual KG fittings and the object **b-prisma-schachtbauwerke** (manholes) connect to each other through the built-in **docking assistant** — without additional tools and without the Archicad MEP add-on. All objects involved remain normal, fully editable Archicad objects.

How it works

Every object reports its connection points (position, direction, nominal size, gradient) to the **coordinate file of its pipe group** — a simple text file per group (e.g. one per underground drain system, one per independent stack). A newly placed object reads this file, finds the nearest connection and aligns itself:

- it **rotates** into the direction of the run,
- **snaps** exactly onto the connection point,
- adopts the **height** (axis to axis — with differing diameters the invert governs),
- and optionally the **nominal size and gradient** of the partner.

Docking is triggered by the **"Dock now"** button in the settings dialog.

Operation

- Give all objects that belong together the same **pipe group** (e.g. `GL-01` — preset at the factory). Each group has its own coordinate file; the storage location is automatically a standard folder that is writable on every machine (Mac: `/Users/Shared/`, Windows: `C:\Users\Public\`).
- Place the object near a connection (**search tolerance** adjustable, default 0.25 m) and touch it briefly once — this registers its own points.
- Click **"Dock now"** in the settings dialog — the object rotates, snaps and adopts the height.
- The **status line** reports the result in plain text ("DOCKED … distance, rotation, height offset") — or, if unsuccessful, the distance to the nearest point.

Docking works at **every free pipe end** and at **every branch socket** of a Flexi-Drain run, at the connections of the individual fittings and at the manhole connections. The button can be pressed again at any time, for instance after the run has been moved or the connection changed.

Docking to the manhole

The object **b-prisma-schachtbauwerke** works in both directions:

- **Pipe to manhole:** the manhole reports channel inlet, channel outlet and all free inlets/outlets (each at the outer wall face, at pipe axis height) to the coordinate file. Flexi-Drain runs and fittings dock directly onto them — including height adoption to the channel invert.
- **Manhole to pipe:** using the "Dock now" button (page "Docking") the manhole fetches a pipe end itself: the **channel rotates** into the direction of the run, the manhole snaps onto the point and raises/lowers itself to the pipe axis. Optionally it adopts the channel width from the pipe. This requires a channel type with a straight inlet.

Cleaning up

If objects are deleted, their entries initially remain in the coordinate file. The **"Reset file"** button (Flexi-Drain, page "Connections") clears the file; afterwards every existing object re-registers itself when briefly touched.

Limits: storage location and teamwork

The coordinate file is stored on the **local machine**. In Teamwork, each workstation therefore only sees the connection points registered on its own machine — docking does not work across workstations.

The storage location can be moved: the **parameter list** of the object settings dialog (the tabular view

next to the graphical interface) holds two expert parameters, in Flexi-Drain as well as in every fitting:

PARAMETER	FACTORY SETTING
Expert: base folder for coordinate file (Windows)	`C:\Users\Public\`
Expert: base folder for coordinate file (Mac)	`Macintosh HD:Users:Shared:`

Three things to keep in mind:

- The **Mac path uses colon notation** with the volume name first and a trailing colon — not `/Users/Shared/`. A Unix path produces no error message, just a file that is never found.
- The folder **must exist**: GDL can create files, but not folders. The base folder is only the prefix; the file name is built as `bprisma_punkte_<pipe group>.txt`.
- The parameter belongs to the **individual instance**, not to the project. If you change it, set it once, save the object as a **favorite** and place everything from there; existing objects can be selected together and switched.

A shared network folder for several workstations can therefore be configured, but it is **not tested and currently not supported** — several workstations would write to the same file at the same time. What is tested and supported is the standard folder on the local machine.

Tips

- The same **pipe group** for all participants is mandatory — otherwise they cannot "see" each other. Separate systems get separate groups: smaller files, no confusion.
- If an object does not dock although it is close enough: briefly touch the **partner** once (it rewrites its points) and dock again.
- Keep the search tolerance small (0.25 m) so that the wrong end is not found where pipes run close together.

13 KG fittings as individual objects

The supplied fittings **KG-Rohr, KG-Bogen, KG-Bogen-90, KG-Abzweig, KG-Reduzier and KG-Revision** can also be placed individually — for detailed design where the run is built piece by piece:

- **Installation position:** "vertical" (e.g. stack) or "horizontal" (underground drain). Horizontally the fittings show the familiar 2D representation with fill and center line and take part in **docking**.
- **Gradient (%):** the fitting tilts along its axis; when docking it adopts the partner's gradient automatically.
- **Free orientation (horizontal):** in addition to the rotation about its own axis, an individual fitting can be **tilted** (raises the spigot out of the horizontal, on top of the gradient) and **swivelled** in plan. The connection points rotate along — when docking, the fitting also adopts its partner's **tilt**, so freely inclined runs continue in line. When called from the Flexi-Drain run these rotations have no effect; the run orients its fittings itself.
- **Adopt nominal size from the target point** is active by default — the reducer adapts itself the right way round: socket → inlet side, spigot → outlet side; for the branch the connection that was hit determines whether the main or the branch size is adapted.
- Every fitting has its own tidy settings dialog with all everyday parameters and the docking status line.

14 Parts list and quantity take-off

Flexi-Drain continuously calculates the fitting breakdown of the run as a parts list — all output paths use the same data basis and produce identical figures:

- **Parts list as 2D text** (tab "Layout"): text block directly in the floor plan next to the run, movable and rotatable by hotspot.
- **Parts list as text export** (tab "Layout"): writes the items to a freely selectable text file at the push of a button.
- **Archicad quantity take-off:** every item is stored as a **component** and appears in component lists of the classic Archicad calculation — e.g. "KG-Rohr d160 L=3000 mm", "KG-Abzweig 45° d160/d110", each with quantity. In addition the total pipe length in linear meters and a description line (system, gradient, route length) are output.

Evaluation tool (project-wide overall parts list)

For evaluation **across all runs of a project** every Flexi-Drain instance automatically writes a parts list

file (switch "Export for evaluation tool", active by default):

- **Mac:** `/Users/Shared/bprisma_bom_<group>_<ID>.txt`
- **Windows:** `C:\Users\Public\bprisma_bom_<group>_<ID>.txt`

These files are evaluated with the supplied **Flexi-Drain-Auswertung.html** — a single HTML file that runs offline in any browser without installation:

- Double-click `Flexi-Drain-Auswertung.html`.
- Drag and drop the `bprisma_bom_…` files into it (simply all of them — the tool recognises related files and automatically deselects outdated versions).
- Result: overall parts list across all runs plus an individual breakdown per run, with key figures (route length, pipe linear meters, quantities). The buttons let you **print / save as PDF** or **export for Excel** (CSV).

Note: files of deleted runs or renamed pipe groups remain in the folder (Archicad cannot delete files). The tool sorts them out automatically via the internal ID; occasional tidying of the folder does no harm nonetheless.

15 Building materials and surfaces

- **3D surfaces** for the outer and inner pipe wall (LOD 300).
- **Building materials** for the fittings (outer/inner layer, sealing ring) on the Layout subpage "Materials" (LOD 500).

16 BIM / IFC (tab "BIM / IFC")

IFC classification as `IfcPipeSegment` including gradient in degrees, weight estimate and Uniclass code.

17 Standards checks and warnings (tab "Warn")

The object continuously checks the run against DIN 1986-100 / OENORM / SIA 385 — you select which set of standards applies on the "Basics" tab. All findings are collected on the last tab, "Warn". The number in its title — for example **Warn (2)** — tells you how many open items there are without opening the tab at all. Empty brackets mean every check passed, and the tab states so explicitly.

Warnings follow from the values you entered and disappear by themselves once the cause is resolved. They block nothing: the object keeps drawing and calculating, because in existing buildings and special cases a deviation from the standard may well be intended. The decision stays with you.

The following is checked:

- **Gradient below the required minimum** — depends on standard, run type and nominal size; the message states both actual and required value
- **Gradient above 5 %** — unusually steep, usually a typing error
- **Double branch** — two opposing branches at the same position
- **Missing access opening** after a change of direction over 45°
- **Reducer against the direction of flow** — the nominal size must not decrease downstream
- **Reducer outside the length of the run**
- **Drop height raised to the minimum** — the height you entered was not enough for the bend construction
- **Vertical drop outside a manhole** — vertical is only admissible inside a manhole (DIN 1986-100)

- **Drop inside a manhole from 1 m** — a backdrop pipe is required here
- **Following segment too short for the offset** — the angled drop needs more horizontal run than remains after it
- **Docking point budget exhausted** — only branches 1 to 16 receive connection points for the docking assistant

The tabs in the page navigation also carry small symbols hinting at the content of each page, including the sub-pages of "Layout".

18 Support

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19 Scope of delivery and installation

Flexi-Drain is delivered as an **LCF file** (Library Container File). It contains the complete library: the main object, the fittings (KG-Rohr, KG-Bogen, KG-Bogen-90, KG-Abzweig, KG-Reduzier, KG-Revision) and the catalog, docking and language macros.

Load the LCF file into your project via the **Library Manager** (File > Libraries and Objects > Library Manager) — everything is bundled in a single file, so nothing can get lost.

20 System requirements

This object works from **Archicad 27** upwards, on Windows and macOS.

21 Language versions

Flexi-Drain is delivered in a German and an English edition. Further language versions can be provided on request.

22 Update check

Please use the **"Online version check"** button on the first page of the settings dialog. It takes you to a web page that checks whether you own the current version. All updates are free of charge for verified purchasers of the object — submit the form you find there and you will receive the latest version.

23 Disclaimer and licence

This software is supplied "as is". The library element has been tested extensively; however, b-prisma accepts no liability for possible loss of data, data corruption, hardware damage or other damage (including damages for loss of profit, business interruption, loss of business information or data, or other financial loss).

This object is not freeware. Please be fair and do not pass it on to third parties. With a purchased licence, however, you may work on any number of computers in your office or at home.

24 Questions and suggestions

Questions and suggestions are most welcome — as a GDL programmer I like to learn how you use the object and which limitations or improvement requests you have.

Feel free to send me an e-mail at: **25@b-prisma.de**