Toolkit

VOL 2. RAIN FLOWERS

ŁDF ŁÓDŹ DESIGN FESTIVAL

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Vol. 2 | Rain Flowers

Rain Flowers is the result of work carried out within the Łódź pilot of the PALIMPSEST project, in which the main theme became water management in urban conditions.

In response to alternating periods of drought and intense rainfall, we sought solutions that could be applied locally – in places where water-related problems are most visible: in small parks, along building frontages, near courtyards, and within planting beds.

In collaboration with the artist **Magdalena Stecka**, a concept was developed for ceramic retention vessels inspired by traditional irrigation methods but adapted to urban conditions. Rain Flowers consist of a porous vessel buried in the ground and a ceramic funnel shaped like a stylized flower, which allows rainwater to be collected and reduces evaporation. The set is complemented by ceramic leaves – elements that help direct water into the vessel while also serving as a visible marker of the installation in the space.

It was crucial for us that Rain Flowers remain an aesthetic, functional solution that can be produced locally in small batches, while at the same time addressing the real needs of plants during periods of drought. For this reason, the prototypes were tested in collaboration with the Faculty of Biology and Environmental Protection of the University of Łódź and the European Regional Centre for Ecohydrology of the Polish Academy of Sciences.
The studies confirmed that vessels of this kind gradually release water into the soil, support moisture in the surrounding area, and can complement urban micro-scale retention systems.

Rain Flowers are a tool that can be independently crafted from ceramics, installed, and further developed – both in community gardens and in courtyards, on balconies, or in public spaces. They combine craftsmanship, design, and natural soil processes, making it possible to capture water where it falls and use it to support urban greenery.

What are Rain Flowers?

Rain Flowers are ceramic retention–irrigation vessels created specifically with urban conditions in mind.

They combine a practical function – collecting and releasing water – with a visual one, as they also act as small artistic installations that can appear in public spaces, courtyards, community gardens, or balcony planters.

At the core of Rain Flowers is a ceramic vessel buried in the ground. Its lower, unglazed part functions as a natural filter that gradually releases water directly into the soil. As a result, moisture is retained for longer – even during drought – and plants in the immediate vicinity can benefit from steady, gentle irrigation.

The upper part of the vessel takes the form of a glazed cup inspired by the shape of a flower – a funnel that captures rainwater and directs it straight into the vessel. The glaze prevents the water from evaporating too quickly, and the whole form makes the installation a distinctive visual element. Ceramic leaves mounted on thin wires, which can be inserted into the soil around the vessel, are also an integral part of the project. They serve two functions: first, they help channel water from a larger surface area into the cup, acting like small gutters. Second – they mark the location of the installation and organize the surrounding space, making Rain Flowers a visible element of the composition.

Rain Flowers maintain a stable, predictable mode of operation. They are a simple tool that anyone can install independently: bury the vessel, position it at the correct depth, add ceramic funnel, and optionally complement the set with ceramic leaves. Workshop activities conducted during the project showed that residents quickly understand how the system works and are eager to test it in their immediate surroundings.

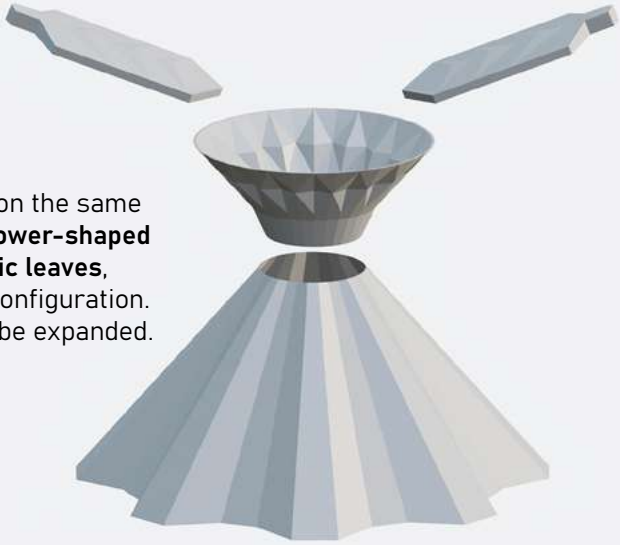
The Rain Flowers project has from the outset assumed the possibility of replicating and scaling its elements. The same principle of operation – a porous vessel underground, a glazed funnel in the shape of a flower, and ceramic leaves directing water – can be applied in three basic scales.

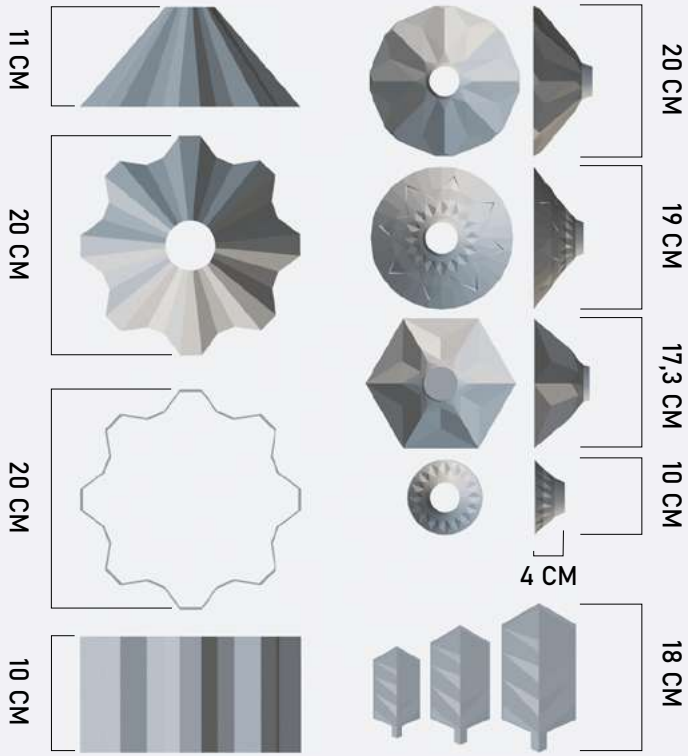
The smallest variant of Rain Flowers can be used on balconies and in garden pots. This version employs smaller forms: a small funnel, a mini-reservoir, and delicate ceramic leaves. The capacity of the smallest vessels is approx. 750 ml, which is sufficient to stabilize moisture within an area up to 10 cm in diameter.

Medium-sized Rain Flowers are intended to be buried in garden beds or small community gardens. The underground structure then consists of two interconnected elements with a capacity of approx. 1.5 litres. Several such units placed at regular intervals help maintain moisture across the entire bed within an area of approx. 30 cm in diameter, without the need for frequent manual watering.

The largest form of Rain Flowers can serve as part of an irrigation system for larger areas, where water retention is necessary and runoff is sufficient to fill the entire reservoir with a capacity of approx. 2.4 litres. In this case, the irrigation range covers an area with a diameter of 60 cm.

All three types are based on the same elements: **a reservoir, a flower-shaped funnel, and a set of ceramic leaves**, differing only in size and configuration. This allows the system to be expanded.





Rain Flowers – step by step

STEP 1 – collaboration with a ceramics studio

Rain Flowers can only be produced in collaboration with individuals or a studio that has:

- a 3D printer for creating positive molds,
- the ability to produce plaster casting molds,
- basic ceramic tools,
- a kiln for firing ceramics.

Various models of collaboration are possible, but we recommend contacting local ceramic artists – especially studios already familiar with the project, such as **Studio Magdalena Stecka.**

The toolkit assumes the possibility of co-creating and customising the elements, yet the technological process remains unchanged.

STEP 2 – creating the 3D models

3D models should be downloaded from **www.lodzdesign.com**

- funnels (various sizes),
- underground reservoirs (mini / medium / large),
- leaves

The models make it possible to produce positive prints from which the plaster molds will be created.

STEP 3 – creating the plaster negative molds

Plaster molds are cast from the 3D prints and will later be used to form the subsequent ceramic elements. This step is best carried out under the supervision of specialists.

STEP 4 – producing the ceramic elements

The ceramic components of Rain Flowers are created by pressing or casting ceramic slip into the previously prepared plaster molds. The plaster absorbs water from the slip, allowing the walls of the elements to form evenly, and ensuring that the structure maintains the parameters defined in the 3D design.

At this stage, it is crucial to maintain correct proportions, wall thicknesses, and proper clay selection – without this, the final product will not function as a retention vessel.

Clays used in the project:

SiO2 Apache clay

George and Schneider 930 clay

George and Schneider 33 clay

George and Schneider 33 clay + 10% chamotte*

*Chamotte is a ceramic material produced by firing and then grinding clay. It is added to ceramic clay to increase the durability of finished products and reduce cracking.

1. Cups (funnels)

The cup is the most visible element, but above all, it is a functional retention funnel. Field and laboratory tests highlighted several essential construction requirements:

- the lower part must include a section of solid bottom with a strainer – a set of at least a dozen small holes that allow water to pass through while preventing insects from drowning
- the optimal funnel diameter is 14–20 cm, as this:
  - **collects an adequate amount of rain,**
  - **does not shade the soil,**
  - **maintains visual and mechanical balance,**
  - **a diameter >20 cm may reduce the amount of rain reaching the surrounding soil.**
- a moderate wall thickness is recommended so that the cup remains stable but not too heavy
- the cups should be glazed on both sides so they do not absorb water

2. Lower vessel (reservoir)

The lower part is crucial to the functioning of Rain Flowers – it is responsible for retaining and slowly releasing water.

- the reservoir is always unglazed
- the type of clay matters:
  - **it should be porous,**
  - **the higher the porosity, the faster the water transfer and the better the interaction with the soil.**
- an even wall thickness is important to ensure stable water release

Three basic scales are available:

- mini – **approx. 0.4 l** (pots, balconies),
- medium – **approx. 1.5 l** (garden beds, small gardens),
- large – **approx. 2.4 l**; intended for local retention over larger areas.

The 3D models allow these sizes to be scaled, meaning the user can enlarge or reduce the reservoir according to the needs of the site.

3. Leaves and mounting sockets

The leaves function as small ceramic channels that direct water into the funnel. They are also an important visual element that organizes the space around the installation.

- each leaf is always produced as a separate element
- a socket – a small spherical or conical part with a hole – is attached to the underside of the leaf
- the hole must be made during the forming stage
- the sockets should be fitted immediately to the intended sticks, e.g. bamboo skewers or cotton-candy sticks – this helps avoid dimensional discrepancies after firing

Once dried and bisque-fired, the socket can be glued to the leaf (either during glazing or after firing, depending on the method), and then placed on a stick anchored in the soil.

STEP 5 – preparation and first firing (bisque)

After drying, the elements are fired to bisque – the first, low-temperature firing. Its purposes are:

- to remove all moisture from the clay,
- to stabilise the shape of the elements,
- to prepare them for glazing,
- to check whether the holes in the strainer are open,
- to ensure that the sockets for the leaves have not deformed in the kiln.

The clay should be:

- porous,
- low-shrinkage (so the elements do not change dimensions),
- permeable (important for the functioning of the lower reservoir).

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At this stage, any cracks, uneven wall thicknesses, or unwanted deformations may be visible. If necessary, the elements must be corrected or remade. It is also worth checking the tightness of the underground reservoirs – water should seep through them; if it passes straight through, it indicates a crack in the ceramic surface.

STEP 6 – glazing

After the first firing, the elements can be safely glazed.

We glaze only:

- the cups (the above-ground part),
- the leaves.

We never glaze:

- the lower reservoir (it must remain porous),
- the surface where the socket is attached to the leaf (for better adhesion).

The glaze can be chosen according to personal preference – neutral, natural, coloured, matte, or glossy. It is advisable to maintain a consistent colour palette so that Rain Flowers look cohesive when grouped together.

After glazing, the elements undergo a second, high-temperature firing, which hardens the glaze and completes the ceramic process.

STEP 7 – site preparation

BALCONY / POT VERSION

- the vessel is buried so that it is completely surrounded by soil
- the funnel should protrude above the surface of the substrate

GARDEN VERSION (MEDIUM)

- the lower vessel is buried deeper, 3 cm below soil level
- it is important not to fill the inside of the vessel with soil

LARGE VERSION (RETENTION AREA)

- several Rain Flowers are placed in strategic water-flow locations
- the selection of capacity and spacing depends on the size of the catchment area

STEP 8 – installing the leaves

After glazing and the final firing:

- a bisque-fired socket is glued to the underside of each leaf,
- bamboo or wooden sticks are inserted into the sockets,
- the leaves are lightly pushed into the soil around the cup so that they direct water into its interior.

STEP 9 – configuration and maintenance

After installing the Rain Flowers, it is advisable to regularly observe the area and the plants' responses.

If necessary:

- additional vessels can be added,
- the arrangement of existing elements can be adjusted to match local conditions,
- the funnel should be cleaned of leaves and the strainer holes checked for blockage regularly (e.g. three times a month),
- ensure that the vessel has not become covered with soil,
- for the winter period, ceramic elements should be removed from the ground – bisque-fired ceramics may become damaged at low temperatures.