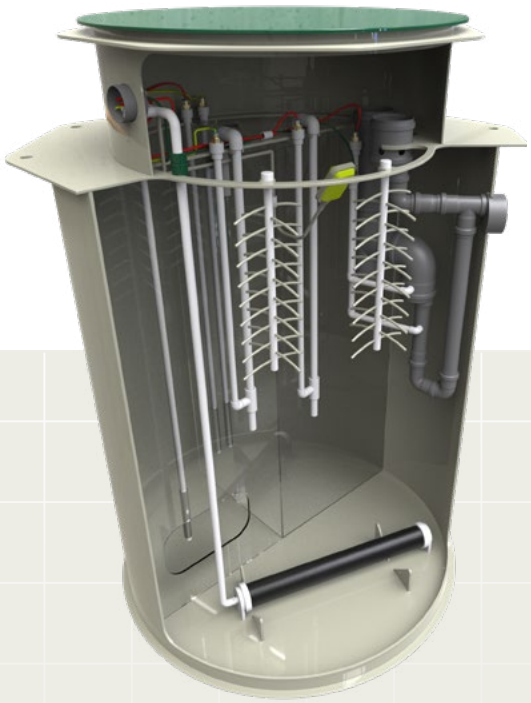
Kolomaki

Prime 7

EN

Comprehensive Documentation and Operating Manual for the Domestic Wastewater Treatment Plant Prime 7

Self-supporting plastic underground domestic wastewater treatment plant Prime 7. Before starting the installation of the product, please read this document carefully and follow its instructions! Failure to comply with the installation manual will result in the loss of warranty rights.



EN

Material: Structural Polypropylene
Model: Eco, Top
Issue Date: 01. 12. 2024

www.kolomaki.com

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Manufacturer:
Kolomaki, s. r. o.,
Komenského 576,
273 71 Zlonice, Czech Republic

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export@kolomaki.com

1. Basic Information and CE

The Kolomaki Prime 7 WWTP, designed for 1–5 population equivalents (PE), operates on the principle of wastewater treatment using suspended activated sludge (SBR technology). Air essential for microorganism survival is supplied by a membrane blower located outside the treatment plant. The blower also powers Aerolifts (airlift pumps), which transfer water between the individual chambers.

The cleaning process is controlled by a timer with a preset program. This is a certified product offering simple installation, easy operation, and the flexibility to adapt to user requirements.

Kolomaki Prime 7 Variants

- **Eco:** For customers who prefer a simple design, low maintenance, and affordability. It offers a fully functional WWTP at a competitive price.
- **Top** A feature-rich WWTP with advanced control, enhancing the quality of wastewater treatment and automating the process. An ideal combination of cost and quality.

Construction Advantages

- Reliable and durable tank design
- Low-profile structure for easy installation and transport
- Small tank diameter for enhanced resistance
- Robust internal T-braces
- High-quality materials made in the Czech Republic
- Simple design with minimal maintenance requirements
- External control unit protected from flooding

Technological Advantages

- Proven SBR technology with over 30 years of reliability
- Unique ARWO water outlet regulation system
- Professional aeration and oxygenation of water
- Pre-programmed and reliable Aerolift water circulation system
- Ability to reuse treated water with the Booster Tank
- Izntegrated sludge tank for easy cleaning
- Reserve volume capable of handling higher water inflow
- Option to integrate emergency signaling

Additional Benefits

- Customer support and service throughout the Czech Republic
- Configurable options tailored to individual needs and budgets
- Low operating costs
- Affordable maintenance

Basic and Additional Equipment

	ECO	TOP
Plastic Cover	+	+
Decorative Cover with Rim	-	-
Composite Walkable Cover	-	-
Blower Container	-	-
Blower Stand	-	-
Timer	+	+
Air Distribution Valve	-	+
Hair Traps	+	+
Biofilm Carrier	-	-
Bioactivator Kolomaki Black	-	-

+ Included in the construction price / - Equipment available for purchase separately

Strojírenský zkušební ústav, s.p., Hudcova 424/56b, Medlánky, 621 00 Brno, Česká republika
Certifikační orgán certifikující produkty
Engineering Test Institute, Public Enterprise, Hudcova 424/56b, Medlánky, 621 00 Brno, Czech Republic
Product Certification Body

CERTIFIKÁT / CERTIFICATE

Číslo:
Number: **CPR-B-00982-22**

Výrobce: *Manufacturer:*	Kolomaki s.r.o. Komenského 576 273 71 Zlonice Česká republika – *Czech Republic* IČ/*Company ID No.*: 06142974
Výrobek: *Product:*	Domovní čistírny odpadních vod *Domestic wastewater treatment plants*
Typové označení: *Type designation:*	Kolomaki Prime 7, Kolomaki Prime 9 viz 2. strana / *see Page 2*
Aplikovaná harmonizovaná norma: *Harmonized standard applied:*	ČSN EN 12566-3+A2:2014 Tab. ZA 1
Podklad pro vydání certifikátu: *Basis of Certificate issuance:*	Protokol o posouzení vlastností stavebního výrobku č. 1015-CPR-30-16025/TZ ze dne 2022-05-31 *Report on assessment of the performance of construction product 1015-CPR-30-16025/TZ of 2022-05-31*

Strojírenský zkušební ústav, s.p., potvrzuje, že posoudil vlastnosti stavebního výrobku v souladu s ustanovením bodu 1.4 (b) Systém 3 přílohy V nařízení Evropského parlamentu a Rady (EU) č. 305/2011 ze dne 9. března 2011 (nařízení o stavebních výrobcích neboli CPR), v platném znění, a stanovil vlastnosti základních charakteristik stavebního výrobku.

Strojírenský zkušební ústav, s.p. (Engineering Test Institute, Public Enterprise) hereby confirms that it has carried out an assessment of the performance of the construction product in accordance with Item 1.4 (b), System 3, Annex V of Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 (Construction Products Regulation – CPR) as amended, and has determined the performance of essential characteristics of the construction product.

Tento certifikát nenahrazuje příslušný dokument vydaný oznámenou laboratoří, tj. Protokol o posouzení vlastností stavebního výrobku.
This Certificate is not a substitute for the relevant document issued by the Notified laboratory, i.e. Report on assessment of the performance of construction product.

Brno, 2022-05-31

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ

Ing. Tomáš Hruška
ředitel – *Director*

2. Function Description

2.1 Description of ECO

The Prime Eco cleaning technology is controlled by a timer, which for the Prime 7 WWTP has the following cleaning phases programmed:

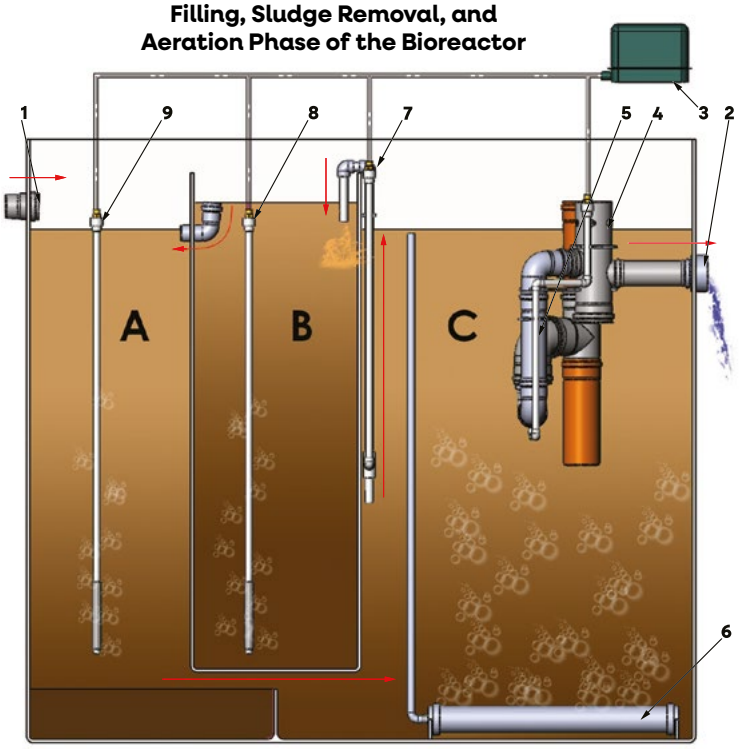
1. Filling, Sludge Removal, and Aeration Phase of the Bioreactor

Wastewater flows into the inflow chamber (A), where gentle aeration prevents the formation of hardened sludge on the water surface and supports the settling of heavy waste particles. The water then flows through a bottom opening into the bioreactor (C). The bioreactor (C) and inflow chamber (A) function as hydraulically "connected vessels." In the bioreactor (C), the main aeration element enriches the water with oxygen and mechanically aids in breaking down coarse impurities (e.g., toilet paper). The ARWO system in the bioreactor (C) regulates the water outflow rate and prevents impurities from leaving the WWTP. An aerolift located in the bioreactor (C) transfers sludge to the sludge tank (B), where it settles, and the remaining water flows back into the inflow chamber (A). Thanks to the high oxygen content in the bioreactor (C), microorganisms initiate the biological nitrification process, which removes nitrogen and improves water quality.

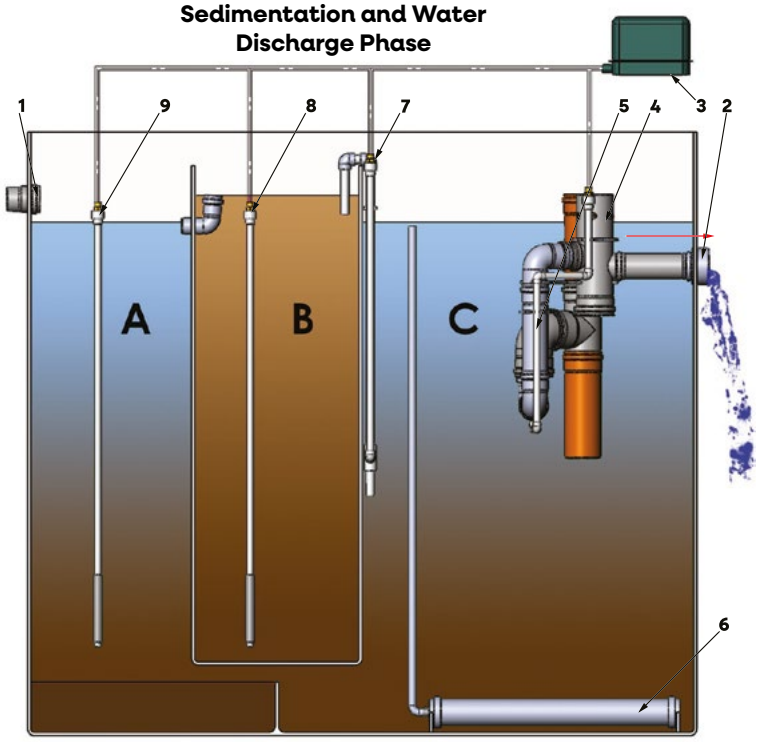
2. Sedimentation and Water Discharge Phase

Aeration stops, and the activated sludge settles at the bottom of the bioreactor (C). The ARWO system switches to the water discharge mode for treated water. The oxygen level in the water decreases, initiating the denitrification process.

Filling, Sludge Removal, and Aeration Phase of the Bioreactor



Sedimentation and Water Discharge Phase



Description of Components

A Inflow Chamber
B Sludge Tank
C Bioreactor

1. Inlet Pipe
2. Outlet Pipe
3. Blower
4. ARWO System
5. Emergency Overflow
6. Main Aeration Element
7. Aerolift
8. Aeration Element 1.6 mm

2.2 Description of TOP

The TOP cleaning technology is controlled by a timer, which for the Prime 7 WWTP has the following cleaning phases programmed:

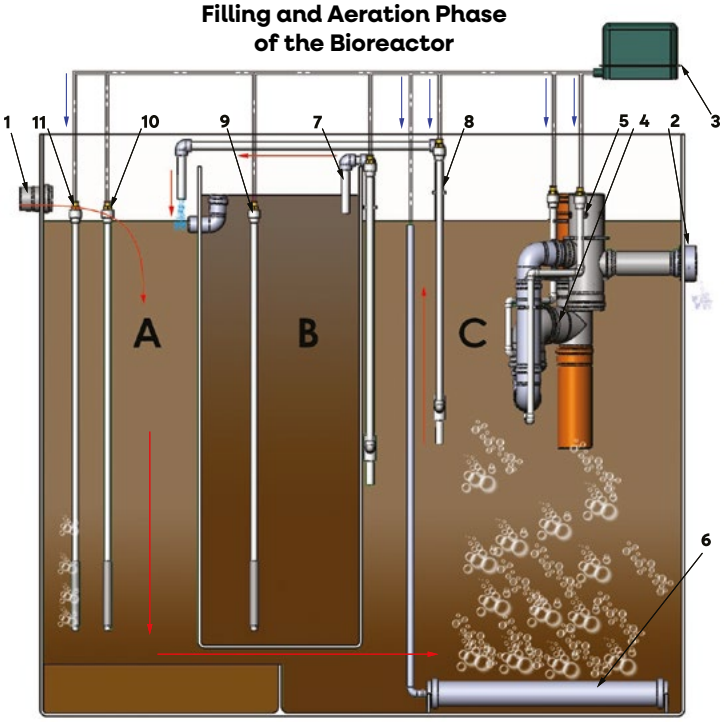
1. Filling and Aeration Phase of the Bioreactor

Wastewater flows into the inflow chamber (A), where gentle aeration prevents the formation of hardened sludge on the surface and promotes the settling of heavy waste particles. The water then flows through a bottom opening into the bioreactor (C). The bioreactor (C) and inflow chamber (A) function as hydraulically "connected vessels." In the bioreactor (C), the main aeration element enriches the water with oxygen and mechanically aids in breaking down coarse impurities (e.g., toilet paper). The ARWO system in the bioreactor (C) prevents impurities from leaving the WWTP. The recirculation aerolift transfers sludge back to the inflow chamber (A), ensuring continuous water circulation within the system. Due to the high oxygen content in the bioreactor (C), the nitrification process begins, which removes nitrogen and improves water quality.

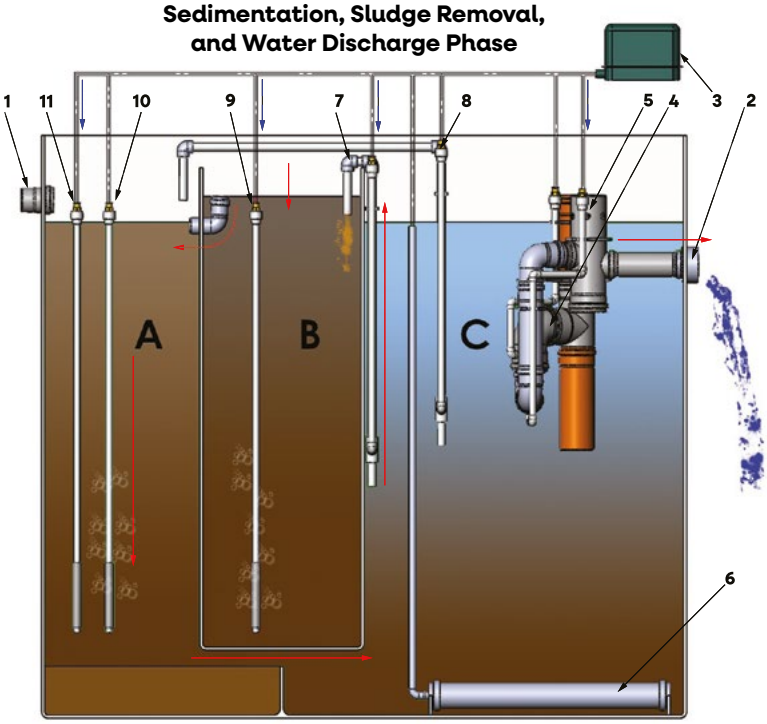
2. Sedimentation, Sludge Removal, and Water Discharge Phase

The main aeration element is turned off, allowing the activated sludge to settle at the bottom of the bioreactor (C). The secondary aerolift transfers excess settled sludge to the sludge tank (B), maintaining the standard sludge level in the bioreactor (C). The sludge settles in the sludge tank (B), while the remaining water flows back into the inflow chamber (A). The ARWO system switches to water discharge mode, regulating the flow rate of treated water leaving the treatment plant. As the oxygen level in the water decreases, the denitrification process begins, further enhancing the water quality.

Filling and Aeration Phase of the Bioreactor



Sedimentation, Sludge Removal, and Water Discharge Phase



A Inflow Chamber
B Sludge Tank
C Bioreactor

1. Inlet Pipe
2. Outlet Pipe
3. Blower
4. ARWO System
5. Emergency Overflow
6. Main Aeration Element
7. Aerolift
8. Recirculation Aerolift
9. Aeration Element 1.6 mm B
10. Aeration Element 0.9 mm A
11. Aeration Element 1.6 mm B

3. Parameters and Technical Report

Technical Parameters

Type	PRIME 7
Number of inhabitants	1–5
Inflow [m³/day]	0,75
BOD load [kg/day]	0,30
Power consumption at 100% load [kWh/day]	1,44
Weight [kg]	120
Dimensions (diameter × height) [m]	ø1,2 x 1,8 - 2,5

Efficiency Achieved During Testing According to ČSN EN 12566-3

Parameter	COD	BOD_5	TSS	Total P	Total N	Ammonium N
Efficiency	96 %	99%	98%	75%	79%	86%

Guaranteed Parameters of the Prime 7 WWTP for Discharge into Groundwater [1)]

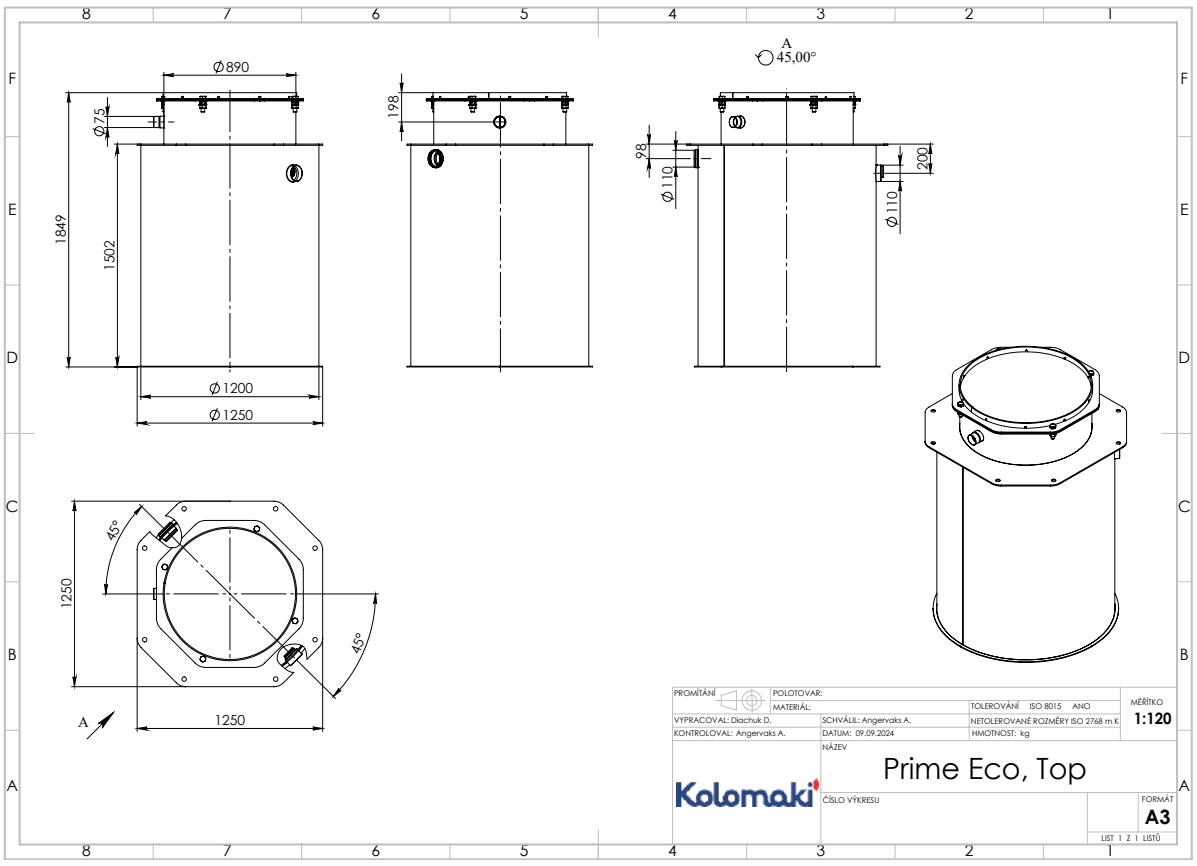
Parameter	COD	BOD_5	TSS	Total P	Total N	Ammonium N
Value [mg/L]	130	30	30	8	20	20

1) Complies with the conditions of Government Regulation No. 57/2016 Coll. and applies to all treatment plants that operate at the designed capacity and follow the operating manual.

Guaranteed parameters of the Prime 7 WWTP for discharge into surface waters [2)]

Parameter	COD(„p“)	COD(„m“)	BOD_5(„p“)	BOD_5(„m“)	TSS(„p“)	TSS(„m“)
Value [mg/L]	110	170	30	50	40	60

2) Complies with the conditions of Government Regulation No. 57/2016 Coll., Annex No. 7, for the best available technologies and applies to all treatment plants that operate at the designed capacity and follow the operating manual.



4. Transport

The transport of the WWTP can be arranged in several ways: by the client's own transport, by Kolomaki company vehicles, or through a transport company. Upon delivery to the installation site, suitable equipment must be prepared, such as an excavator, crane, or forklift, along with a sufficient number of personnel—at least two people.

Safety Instructions:

- **Handle with care:** Transportation, loading, and unloading must be carried out with the utmost care.
- **Avoid rough handling:** Impacts and collisions are strictly prohibited as they can damage the structure.
- **Secure properly during transport:** Ensure that the WWTP is securely fastened without excessive force, which could deform the product.
- **Caution in low temperatures:** At temperatures below 5 °C, polypropylene becomes brittle, so extra care must be taken to avoid damage caused by impacts.

5. Installation

5.1 Basic Information

The Prime 7 wastewater treatment plant consists of a self-supporting circular plastic tank with an external diameter of 1.20 m and a total height of 1.8 m (or 2.5 m). The treatment plant is installed in an excavation so that its cover is at least 50 mm above the adjusted ground level. It is factory-equipped with inflow and outflow pipes of DN 110 mm. Standard configurations include an inflow pipe with a bottom depth of -395 mm and an outflow pipe with a bottom depth of -501 mm below ground level. The inflow always connects to the inflow chamber, while the outflow also functions as a safety overflow.

5.2 Placement Conditions

Before installation, it is necessary to select a suitable location for the excavation.

- The excavation must be at least 1 meter away from any structure. Load from any structure could cause deformation. The WWTP must not be built over.
- The excavation should be placed in a safe location, away from potential risks. For example, tree roots must not come into contact with the walls of the WWTP.
- The WWTP must be at least 12 meters away from a well.
- The WWTP should be positioned within reach of electricity for connecting the blower and timer.
- The excavation for the WWTP should be relatively close to the property for easier installation.
- If the excavation is on a slope, the terrain must be checked to prevent soil slippage or other complications. A structural calculation and assessment of the suitability of the subsoil or slope stability must be carried out by a structural engineer or construction designer.
- The excavation must be large enough to ensure the proper working space. For excavation dimensions, see 4.3 Standard Installation.
- To anchor the WWTP correctly, the base must be sufficiently firm. The soil around the WWTP must be permeable to water (a hydrological permeability assessment for the specific soil is usually part of the building permit).

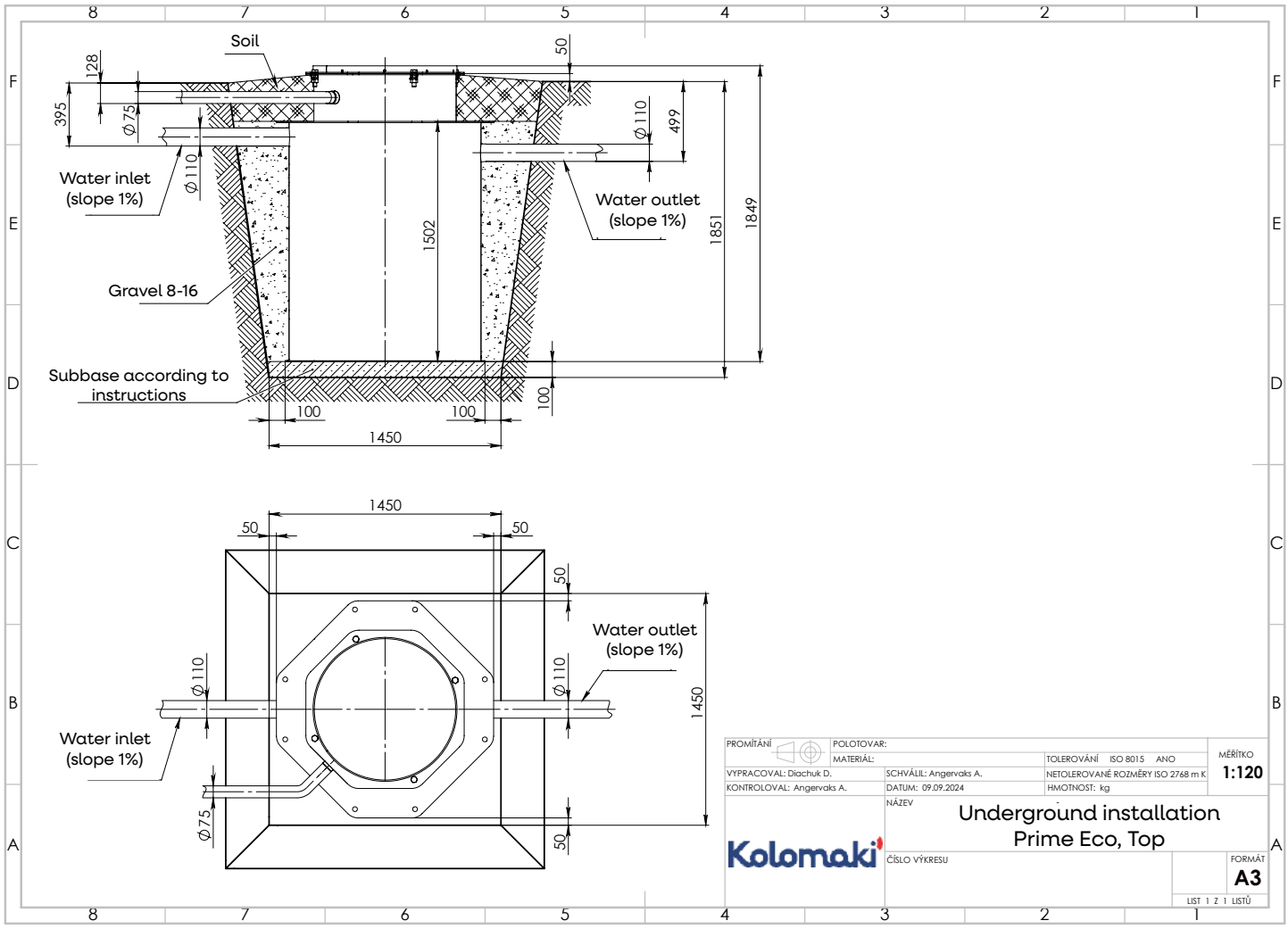
5.3 Backfill Material

The backfill material must anchor the WWTP in the construction excavation and prevent it from moving. It must not contain sharp or hard objects that could damage the WWTP. Suitable materials include aggregate with a fraction size of 8/16 mm or sand mixed with cement in a 1:6 ratio, which is compacted around the tank without mechanical equipment at a pressure of 20 kg. Excavated soil from the trench is not suitable for backfilling the WWTP.

5.4 Standard Installation

Preparation of the Base

For installing Prime 7 under standard foundation conditions (i.e., with the groundwater level below the foundation), excavate a pit (shored if necessary) with minimum dimensions of 1.3 x 1.3 m and a total depth of approximately 1.85 m to 2.65 m. Create a compacted gravel or gravel-sand base with a minimum thickness of 100 mm at the bottom of the pit. The gravel-sand base can be stabilized "dry" with cement or a dry concrete mix. For unstable subsoil, a concrete base is created, reinforced as needed with welded steel mesh. The base under the treatment plant must always be firm and stable.



Installation of the WWTP into the Excavation

The treatment plant is placed on the prepared base, either manually or using machinery. During placement, ensure the base under the WWTP remains clean and free of stones or debris. The WWTP must be installed with a precision of ± 2 mm. Leveling is checked using a spirit level on the top of the WWTP. Afterward, the tank is backfilled with compacted gravel-sand to a height of approximately 300 mm above the tank's bottom, across the entire excavation area.

Connection of Inflow and Outflow

The inflow is equipped with a socket ready for connecting the inflow pipe. The outflow consists of a smooth-ended DN 110 pipe with a bottom depth of -501 mm below ground level.

Backfilling and Filling the WWTP

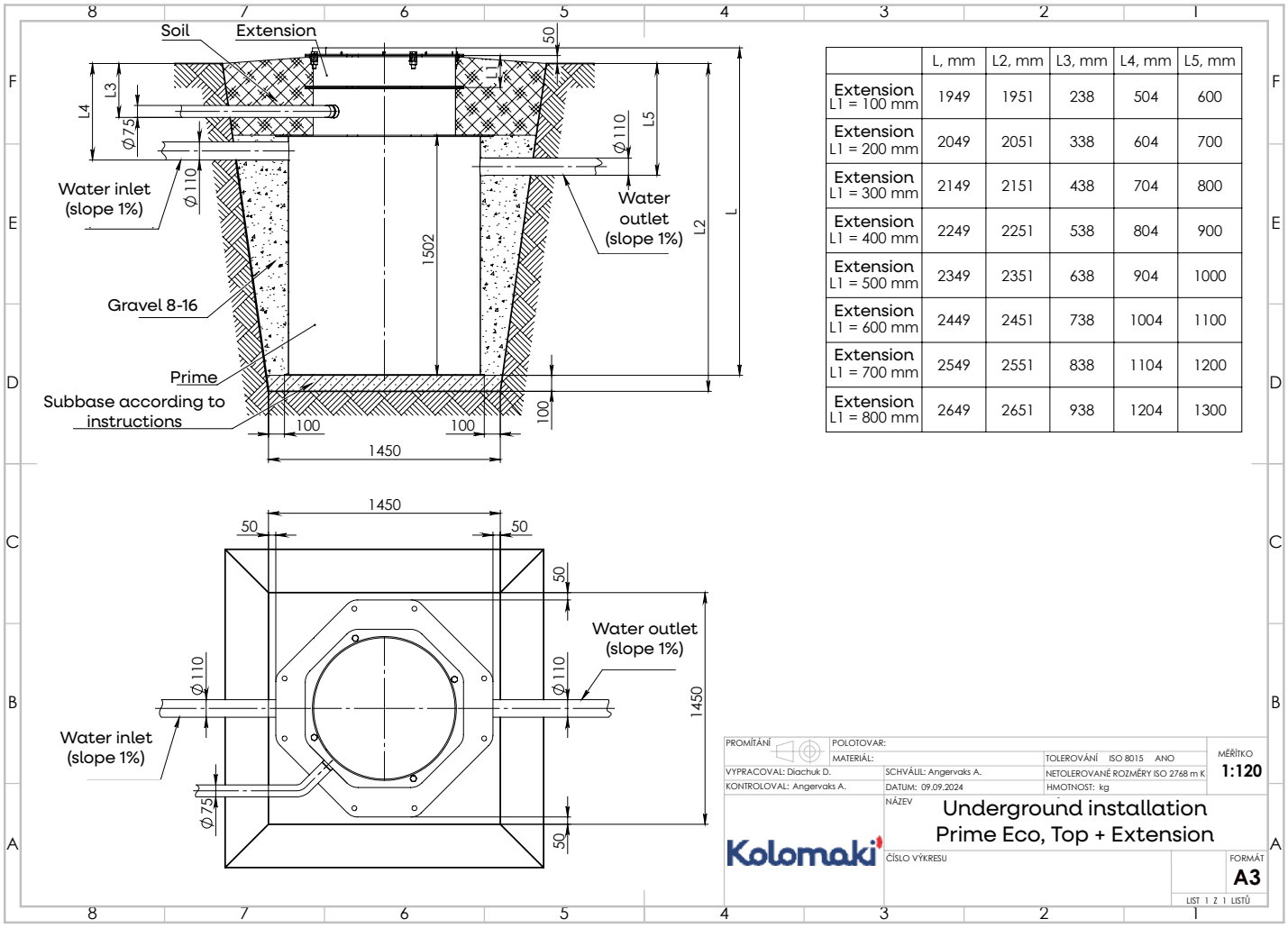
After placement, the WWTP is filled with water to a depth of approximately 1.0 m and then backfilled with gravel or original soil, provided it contains no large stones that could damage the plastic shell. The backfill under the connecting inflow and outflow pipes must always be made of compacted gravel-sand (preferably stabilized with cement) to prevent later settlement, which could compromise pipe stability. Once the WWTP is placed in the excavation and connected to the inflow and outflow pipes, it is filled with water to the level of the outflow.

5.5 Non-Standard Installation Situations

All non-standard installation situations must be assessed by a structural engineer or construction designer to eliminate potential damage or hazards. Based on the project, an additional structural assessment must be carried out by a professionally qualified person.

Installation with Extension Necks

The Prime 7 WWTP can be installed with extension necks to adjust the tank's height to various terrains and situations. Extensions are available in lengths ranging from 100 mm to 800 mm. The installation process is almost identical to the standard WWTP installation, differing only in the tank depth. See Underground Installation Prime Eco, Top + Extensions for details.



	L, mm	L2, mm	L3, mm	L4, mm	L5, mm
Extension L1 = 100 mm	1949	1951	238	504	600
Extension L1 = 200 mm	2049	2051	338	604	700
Extension L1 = 300 mm	2149	2151	438	704	800
Extension L1 = 400 mm	2249	2251	538	804	900
Extension L1 = 500 mm	2349	2351	638	904	1000
Extension L1 = 600 mm	2449	2451	738	1004	1100
Extension L1 = 700 mm	2549	2551	838	1104	1200
Extension L1 = 800 mm	2649	2651	938	1204	1300

Installation in Elevated Groundwater Levels

These rules also apply to cases where elevated groundwater levels occur only occasionally. A stable base under the WWTP must always be ensured. The standard design of the tank bottom and shell is rated for groundwater levels up to 1.0 m above the tank bottom, i.e., 1.3 m below ground level.
If the excavation is carried out when the groundwater level is below the foundation, a 100 mm sand base can be created directly under reinforced concrete with a thickness of 150 mm, reinforced with KARI mesh. If construction occurs when the groundwater level is above the foundation, a drainage layer of gravel approximately 300 mm thick must be created, with a sump for a pump to lower the water level below the concrete base. Afterward, a concrete base reinforced with KARI mesh is installed, and the WWTP is placed after the concrete sets. Holes with a diameter of 10 mm are drilled into the outer vertical reinforcements, and reinforcing steel with a diameter of 6 mm is passed through these holes at three levels—100 mm, 300 mm, and 500 mm above the bottom of the tank.

5.6 Commissioning the WWTP

After placing the WWTP into the excavation and connecting the inflow and outflow pipes, the system must be commissioned by a trained technician from DČOV Servis s.r.o. The technician will connect the electrical cables, hoses, and pneumatic tubes on-site. They will then set the timer and, for the Top model, the air distribution valve. Finally, the technician will start the WWTP, add the Kolomaki Black bioactivator, and verify its proper operation.

6. Maintenance and Operating Guidelines

What Type of Water Can Be Directed to the Treatment Plant

The treatment plant is designed to handle domestic wastewater from the property for which it was designed. It is prohibited to discharge any substances into the wastewater system that would harm or prevent the survival and reproduction of microorganisms in the treatment plant.

The following substances are prohibited:

- Medications, poisons, and toxic substances
- Paints, thinners, and chemical sprays
- Undiluted acids and bases
- Condensate from condensing boilers
- Other chemicals

6.1 Maintenance Log Management

The following information must be regularly recorded in the maintenance log table:

1. **Operation and Maintenance Monitoring:** Includes regular maintenance, sludge removal, and any malfunctions. Each record must include the date, a description of the activity, and the signature of the responsible person.

2. **Laboratory Monitoring:** The frequency and scope of laboratory analyses are determined by the water authority or relevant regulations. Parameters monitored include TSS (Total Suspended Solids), COD (Chemical Oxygen Demand), BOD_5 (Biochemical Oxygen Demand over 5 days) and N_{NH4} (Ammonium Nitrogen).

6.2 Visual Inspection and Maintenance of the WWTP

A visual inspection is performed weekly and includes the following tasks:

1. **Inflow Chamber**
   The inflow chamber should be clean and free of debris such as wet wipes, non-degradable, or hard-to-decompose materials.
   If unwanted materials are found, they must be removed immediately.

2. **ARWO System (Outflow System)**
   Check the ARWO system for deposits, coatings, or other debris that could affect its functionality.
   If debris is present, clean the system.

3. **Main Aeration Element**
   A properly functioning aeration element produces a uniform layer of bubbles on the surface of the activation space.
   If the aeration element is dirty, clean it.

4. **Aerolifts (Airlift Pumps)**
   Aerolifts should ensure smooth water flow from one chamber to another.
   Check for blockages in their openings; if any are found, clean them.

5. **Hair Traps**
   Hair traps should be regularly checked and kept clean. If a large amount of hair accumulates, it can reduce the efficiency of the treatment plant.
   Clean the hair traps as needed to ensure they remain unobstructed and functioning properly.

6.3 Maintenance of Individual Components

Blower

- **Daily Function Check:** Inspect the blower for operation, noise levels, or signs of malfunction. If in doubt, contact service support.
- **Monthly Cleaning:** Clean the blower once a month following the attached manual.
- **Annual Membrane Replacement:** To extend the device's lifespan, it is recommended to replace the membranes annually.
- **Note:** The blower must have unrestricted access to air and must not be covered. It is recommended to install a container or stand for proper placement.

Sludge Tank

If during visual inspection, you notice anything unusual that was not present in previous inspections, contact the manufacturer.

6.4 Bioactivator Kolomaki Black

- The package contains 500 g of bioactivator (20 doses).
- **First week:** Apply four scoops.
- **Subsequent weeks**: Apply one to two scoops per week.
- After increased load or chemical interference: Restart dosing with four scoops.
- **One package:** Lasts up to 20 weeks.

6.5 Technical Recommendations

- For easier long-term maintenance of the treatment plant, the use of eco-friendly products is recommended.
- Before starting to use the treatment plant, ensure it is turned on.
- The plastic cover included in the basic equipment has a load capacity of 80 kg.
- The plastic cover with a decorative rim has a load capacity for decorative material of 25 kg.
- The composite walkable cover has a load capacity of 200 kg.
- Water from the WWTP is not suitable for garden irrigation or infiltration into groundwater without additional treatment in the Booster Tank.
- If you have any questions, contact Kolomaki s.r.o..

6. 6. Service Log
6. 6. 1 Operating Log

Date	Operational Measurements					Blower Filter Cleaning	Visual Inspection		Notes (Sludge Removal, Malfunctions, etc.)
	Total	Blower	Aeration	outflow	Sludge		Sludge Value in WWTP (measured in a graduated cylinder)	Special or Extraordinary Situations, Events, Relationships, etc.	

Date	Analysis			
	COD	BOD_5	NL	N_{NH4}

Notes

6.6.2 Warranty Certificate

Serial Number:	Manufactured
	date:

Delivered to Customeri:

date:	carrier:

Installed:

date:	installer:

Serviced

Date / Service Provider / Brief Description of Faults and Repairs

The warranty for the Prime 7 is provided for a period of 2 years. The blower is covered by the standard 2-year warranty. This warranty does not apply to the blower membranes. Always photograph the installation step by step and keep receipts for purchased materials.

7. Manufacturer

Kolomaki s.r.o.
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273 71 Zlonice, Czech Republic
www.kolomaki.com
+420 777 888 323
export@kolomaki.com

It is not possible for this manual to cover all situations that may arise during installation; therefore, carefully consider anything that could potentially damage the product in any way!

7.1 Manufacturer's Responsibility

The manufacturer is responsible for:

1. The overall quality of the product, including compliance with all manufacturing standards.
2. Execution of production, weld quality, and control of manufacturing processes.
3. Inspection of all input materials from suppliers.
4. Assigning each product a unique serial number and production label for potential inspection.
5. Certification of production by TZUS Prague.

The manufacturer is not responsible for damages caused by:

1. Incorrect installation.
2. Inappropriate selection of the WWTP location.
3. Failure to anchor the WWTP in cases of groundwater presence.
4. Use of the WWTP for purposes other than those specified.
5. Improper transportation methods.