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Warsaw, 18 August 2022

NATIONAL TECHNICAL ASSESSMENT

No IBDiM-KOT-2017/0047 version 3

Pursuant to Article 9 par. 2 of the Act of 16 April 2004 on construction products (consolidated text: Journal of Laws of 2021, item 1213, as amended), having conducted the proceedings in accordance with the provisions of the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on national technical assessments (Journal of Laws of 2016 item 1968), at a request filed by:

registered office at: **EW INVEST Eryk Wiśniewski**
ul. Warszawska 95
74-200 Pyrzyce

Instytut Badawczy Dróg i Mostów
confirms its positive assessment of the following construction product:

Elements of recycle plastic sewage well tops

with its commercial name:

Elements of near-surface recycle plastic sewage well tops “TVR T System”

intended to use in communication construction industry, to the extent presented in this IBDiM National Technical Assessment.

DIRECTOR

prof. dr hab. inż. Leszek Rafalski

National Technical Evaluation Date:

30 August 2017

National Technical Evaluation's Expiration Date:

30 August 2027

National Technical Evaluation Document no. IBDiM-KOT-2017/0047 edition 3 contains **28 pages**, including the appendix.

1. TECHNICAL DESCRIPTION OF THE CONSTRUCTION PRODUCT

1.1 Technical name and commercial name

The subject of this National Technical Assessment is a construction product with the following technical name:

Elements of recycle plastic sewage well tops

and with the following commercial name:

Elements of near surface recycle plastic sewage well tops (TVR T System)

hereinafter referred to as:

Elements of near-surface recycle plastic sewage well tops (TVR T System)

1.2. Name and address of the manufacturer, as well as the name and address of a representative authorized by him, if appointed:

The manufacturer of the product is: **EW INVEST Eryk Wiśniewski, with their registered office at: ul. Warszawska 95, 74-200 Pyrzyce.**

1.3. Place of production of the product

The product is produced at the **EW INVEST Eryk Wiśniewski production plant, with their registered office at: ul. Warszawska 95, 74-200 Pyrzyce.**

1.4. type and technical description of the product

1.4.1. Type designation

Based on the manufacturer's information, the Road and Bridge Research Institute determined the following types of construction products:

- 1. Rings.**
- 2. Relief cones and plates.**
- 3. Adaptors for inlets and manholes, compensators, supporting and protective elements.**
- 4. Drive-on and protective covers.**

The product types include the following elements:

- Compensatory rings (type 1) marked with symbol T1, with internal diameters DN/ID from 100 mm to 1000 mm, heights from 10 mm to 250 mm.
- Reducing equalizing rings (type 1), marked with symbol TR, with internal diameters DN/ID from 100 mm to 800 mm, heights from 10 mm to 200 mm (also in the shape of a ½ ring).

- Sealing equalizing rings (type 1) (with elastomer internal gaskets), marked with symbol T1S, with internal diameters DN/ID from 100 mm to 800 mm, heights from 10 mm to 240 mm.
- Compensating rings (type 3) marked with symbol TXK, with internal diameters DN/ID from 150 mm to 600 mm, heights from 110 mm to 240 mm.
- V-rings (type 1) marked with symbol TIK, with internal diameters DN/ID from 100 mm to 1000 mm, heights: 9 mm/22 mm, 15 mm/28 mm and 30 mm/60 mm.
- Compensatory rings with mounting holes (type 1), marked with symbol T1C, with internal diameters DN/ID from 280 mm to 800 mm, heights from 10 mm to 200 mm.
- Compensatory rings with a central lip (type 1), marked with symbol T1N, with internal diameters DN/ID from 320 mm to 800 mm, heights from 30 mm to 150 mm.
- Compensatory rings with an external lip (type 1), marked with symbol T1R, with internal diameters DN/ID from 240 mm to 800 mm, heights from 30 mm to 200 mm.
- Compensatory rings with an internal lip (type 1), marked with symbol T1RO, with internal diameters DN/ID from 200 mm to 800 mm, heights from 10 mm to 200 mm.
- Compensatory rings with cutting for laying them down at a curb (type 1), marked with symbol T2, with internal diameters DN/ID from 200 mm to 600 mm, heights from 10 mm to 240 mm.
- Square-shaped compensatory rings (type 1), marked with symbol T6, with internal diameters DN/ID from 200 mm to 1100 mm, heights from 10 mm to 240 mm.
- Square-shaped compensatory rings with external lips (type 1), marked with symbol ECO2, with internal diameters DN/ID from 120 mm to 1100 mm, heights from 25 mm to 240 mm.
- Relieving cones (type 2), marked with symbol T3, with internal diameters DN/ID from 180 mm to 750 mm, heights from 130 mm to 240 mm.
- Foundation relieving square plates (type 2), marked with symbol T04, with internal diameters DN/ID from 80 mm to 1100 mm, heights from 20 mm to 250 mm.
- Foundation relieving round plates (type 2), marked with symbol T06, with internal diameters DN/ID from 80 mm to 1100 mm, heights from 20 mm to 250 mm.
- Octagonal slabs relieving (type 2) marked with symbol T08, with internal diameters DN/ID from 80 mm to 1100 mm, heights from 20 mm to 250 mm.
- Adapters for hatches and inlets (type 3) marked with symbol TX, with internal diameters DN/ID from 100 mm to 800 mm, heights from 30 mm to 240 mm.
- Adapters for hatches and telescopic inlets, street boxes (type 3), marked with symbol TXP, with internal diameters DN/ID from 80 mm to 800 mm, heights from 30 mm to 240 mm.
- Cover adapters for hatches, inlets, street boxes (type 3), marked with symbol TXO, with internal diameters DN/ID from 80 mm to 1000 mm, heights from 40 mm to 240 mm.
- Rings leading to manhole or self-leveling inlets, adapters (type 3), marked with symbol TXS, with internal diameters DN/ID from 150 mm to 800 mm, heights from 40 mm to 240 mm.

- Non-drive-on and protective covers for concrete and plastic wells (type 4), marked with symbols T4 and T5, with external diameters DN/from 100 mm to 960 mm, heights from 30 mm 360 mm.

Holes in the tops elements may have a centric or eccentric location, as well as square shapes, a rectangular round shape, fitted to the type of the top of the manhole well, non-manhole well, top of a street drain, or infrastructure fittings.

1.4.2. Technical description of the construction product and materials and raw materials used. Product identification

Elements of near-surface recyclate plastic sewage well tops (TVR T System) are integral, alternative upper structural parts of the manhole or non-manhole wells and storm drains, made of concrete or plastics, as described in PN-EN 1917 and PN-EN 13598 -2.

Elements of near-surface recyclate plastic sewage well tops (TVR T System), which include compensatory rings, foundation plates, relieving cones and rings, drain and manhole adapters, and elements supporting the protective equipment of infrastructure fittings are prefabricates made of a mixture of thermoplastic material, formed in the process of extrusion and high-pressure forming. The basic material of the polymer composition is the polyvinyl chloride (PVC), plasticized and non-plasticized, polyolefins (LD-PE, MD-PE, HD-PE, PP, PEX) and admixtures of other polymers and fillers in an amount of up to 20 %.

Parameters of the raw material, polymer compositions, characteristics of recycled plastics used in the production process of the "TVR T System" elements are specified inter alia in PN-EN 15343, PN-EN 15344, PN-EN 15345 and PN-EN 15346. Non-drive-on and protective covers for non-manhole and manhole wells, located in areas not burdened with / excluded from pedestrian or vehicle traffic, are made from recycled plastic compositions, based on polyvinyl chloride (PVC) and/or from a composition of recyclate polyolefins (PE, PP, PP, PP), with mineral fillers up to 60 %.

The surfaces and edges of the elements of near-surface recyclate plastic sewage well tops (TVR T System) should be smooth, without any damage, blisters, recesses, scratches or deformation. The color should be uniform in terms of shade and intensity all over the entire surface of the product.

The characteristic dimensional parameters of the Elements of near-surface recyclate plastic sewage well tops (TVR T System) are presented in the Attachment.

The dimensions ought to be verified according to PN-EN ISO 3126 with a manual caliper, with an accuracy of 0.1 mm.

2. INTENDED USE OF THE PRODUCT

2.1. Intended use of the product

Elements of near-surface recyclate plastic sewage well tops (TVR T System) are intended for application in communication construction, to the extent specified in item 2.2, for construction

of new and repair or rehabilitation of damaged toppings of sewage systems. They constitute an integral structural system supporting the tops of the wells, street drains, infrastructural fittings, and are to be installed between, around and on elements of sewage wells and/or street storm drains, and in particular for:

a) Type 1 compensatory rings, marked with the symbols T1, T1K, T1R, T1RO, T1C, T1N, T1S, TR, T2, T6, ECO2 to:

- adjustment of the height of a sewage well or a storm drain to the street surface level,
- adjustment of the angle of inclination of tops of manhole and non-manhole wells, street drains,
- protection of the stem of the sewage well and the street drain against the negative impact of cast iron bodies of the tops subjected to communication loads,
- ensuring even support to the top bodies,
- protection for concrete elements (near-surface topping) against negative impact of environmental factors,
- foundation for the manhole top, ensuring that the entire load-bearing surface of the body is even, resting tightly on concrete and plastic wells,
- reduction of the internal diameters of sewage and storm wells, the near-surface top,
- sealing the telescopic and self-leveling tops,
- protection of the sewage system against pollution,
- damping, absorption, distraction of communication vibrations;

b) Type 2 relief cones and rings, foundation slabs marked with symbols T3, T04, T06, T08, for:

- transferring communication loads acting on the tops of manhole and non-manhole well tops, and street drains, beyond the well stems onto structural layers of soil or road surface,
- protection of the well stems against damage from vehicle traffic, both in the vertical and horizontal planes,
- height adjustment of the sewage well towards the surface level,
- reduction of free clearance, inner diameter of the stem pipe (chimney) of the manhole, inspection or street drain well,
- creating a structural support (basis, foundation) for expansion rings, adapters, as well as directly for the tops of the wells and street drains, as well as for reconstructed or newly installed road surfaces around the top of a street drain or manhole;

c) Type 3 adapters for manholes and drains, supporting and protective elements for infrastructural fittings, marked with symbols TX, TXP, TXO, TXS, TXK for:

- foundations for street drain tops, ensuring that the entire load-bearing surface of the well body gets a tight, permanent support on the wells and storm drains made of concrete and plastics,

- enabling assembly (altitude and diameter relationship), connection of the surface top of the well with the body of the manhole, self-leveling drain, embedded on/and in the road surface,
- direct and indirect support, embedding in telescopic hatching and grooves in the road surface structure,
- structural support (basis, foundation, cover) for telescopic tops, self-leveling plastic wells and street drains, infrastructural fittings,
- protection of the road surface against negative impacts from of devices and tops subjected to communication and environmental loads,
- compensation for vertical stress of stem pipes in the surface area,
- ensuring space for free operation of the stem pipe under the influence of communication loads and temperature changes,
- structural support for reconstructed or newly installed road surfaces around the tops of street drains or manholes.

d) Type 4 Non-drive-on and protective covers, marked with symbols T4, T5 for:

- protection of the sewage and infrastructure system against pollution, surface water influx, unauthorized access, accidents,
- adjustment of altitude the wells, their elevation above the grade,
- protection of the raising stem of plastic wells against mechanical damage, and also against negative impacts from environmental factors in the surface area,
- thermal protection (thermal insulation) of water meter and teletechnical wells against freezing.

2.2. Product application

The scope of use of the construction product includes:

2.2.1. Public roads without restrictions,

within the meaning of and in accordance with the conditions set out in the Regulation of the Minister of Transport and Maritime Economy of 2 March 1999 on the technical conditions to be met by public roads and their location (cons. text: Journal of Laws of 2016, item 124, as amended) and in the Regulation of the Minister of Transport and Maritime Economy of 16 January 2002 on technical and construction provisions regarding paid motorways (Journal of Laws No 12, item 116, as amended).

2.2.2. Internal roads, without restrictions,

within the meaning of the provisions of the Act of 21 March 1985 on public roads (cons. text: Journal of Laws of 2021, item 1376, as amended).

2.2.3. Road engineering facilities, with a limitation to:

2.2.3.1. bridge facilities;

- a) bridges,
- b) viaducts,
- c) flyovers,

2.2.3.2. tunnels;

- a) tunnels,
- b) underground passages,

within the meaning of and in accordance with the conditions set out in the Regulation of the Minister of Transport and Maritime Economy of 30 May 2000 on the technical conditions to be met by road engineering facilities and their location (Journal of Laws No. 63, item 735, as amended.);

2.2.4. Railway engineering objects with a limitation to:

- a) bridges,
- b) viaducts,
- c) linear tunnels,
- d) underground pedestrian crossings,

within the meaning of and in accordance with the conditions set out in the Regulation of the Minister of Transport and Maritime Economy of 10 September 1998 on the technical conditions to be met by railway buildings and their location (Journal of Laws No. 151, item 987, as amended) ;

2.2.5. Subway engineering structures, with a limitation to:

- a) stations,
- b) tunnels,
- c) technical and stoppage stations,

within the meaning of and in accordance with the conditions set out in the Regulation of the Minister of Infrastructure of 17 June 2011 on technical conditions to be met by subway engineering structures and their location (Journal of Laws No. 144, item 859, as amended).

2.3 Terms of use of the product

The elements of near-surface recycle plastic sewage well tops (TVR T System) can be used in areas intended for vehicle traffic, as well as pedestrian and bicycle traffic, and in green lanes, separating lanes and other areas related to communication engineering. Conditions of foundation, construction, installation and operation of the near-surface recycle plastic sewage well tops (TVR T System) should comply with generally accepted principles of design, laying and assembly of sewage systems set in PN-EN 1610, PN-EN 476, PN-EN 13598-2 and other standards related to water and sewage engineering, as well as with general guidelines and detailed technical specifications of the manufacturer. The use of elements of recycled plastics for sewage wells "TVR T system" should be based on a construction design, taking into account water and ground conditions and expected operating loads, technical recommendations and

instructions for use, assembly of sewage wells and their toppings, based on technical catalogues and manuals of the manufacturers of the wells and toppings.

Compensation rings can be mounted on sewage wells, sewage drains and other technical facilities. They require preparation of an even, stable and durable base/foundation, on which they are to be installed. Any observed unevenness, defects, technological errors on elements constituting direct support for compensation rings and other elements of the "TVR T System" should be removed, using a compensatory and repair layer. The compensatory and repair layer should be made from quick-binding, water-proof compounds in accordance with PN-EN 1504-3.

Before installing the surface tops, using the "TVR T System" elements, it is necessary to make sure the diameter of the compensation ring is correct for a given well or drain size, that the structural elements of the manhole or drain tops are appropriate to the intended use, the class of the topping. All installed compensatory rings and other elements of the TVR T system should adhere to the top surfaces of the stems of the sewage wells, sewage drains, reduction sections, cover panels, relief rings or cones with their entire load-bearing surfaces.

Compensation rings should be laid centrally over the manhole/inspection hole to reach the total required level adjustment. When adjusting, the use of wedge rings should be taken into account to level the top of the transverse and longitudinal roadside of the road surface.

The recommended level of the surface tops, using the "TVR T System" regulation elements, depends on the type, function and location of the well, being: 20 to 30 cm for concrete manhole wells, 50 to 60 cm for plastic manhole wells, taking into account all relief elements, up to 70 cm for concrete or plastic non-manhole or inspection wells, storm drains. All these wells are located in the group 1-4 traffic area, in class D400 according to PN-EN 124-1.

In order to ensure watertightness of the topping, uninterrupted sealing with polymer sealants should be applied between all its elements. It is possible to use compensation rings made of plastic, alternately with concrete rings (a top spacing system). Elements of the "TVR T System" are compatible with concrete elements made according to PN-EN 1917. The footings of the manhole top stems should be rested on with their entire support surfaces on the compensation rings. The outer diameters of the compensation rings that make for a direct support for the top should always be greater than or equal to the outer diameters of the manhole stem footings. At multiple, skeletal manhole footings, it is recommended to use foundation plates (T04), which will provide the stems with support on their entire load-bearing surfaces and protect the surface around the adjusted well against cracking.

If the stems of the manhole well tops or storm drain tops are prepared structurally, and their manufacturer recommends their anchoring, the abovementioned tops can be fixed with bolts to the elements of the near-surface plastic tops. The distance rings can be heat processed from the outside, with a hot mineral-bituminous mixture (asphalt concrete) or concrete. Reconstruction of the surface around the near-surface top should be made in accordance with a design.

The near-surface toppings for plastic wells consist of rings, cones, relief plates arranged centrally around the well stem pipes. The relief elements should be mounted on a properly prepared supporting structure, ensuring safe load transfer to the ground or to structural layers of the surface.

The soil should be compacted in such a way that in areas exposed to dynamic loads from vehicle traffic (group 3 and group 4, according to PN-EN 124-1) it is possible to achieve a soil compaction ratio greater than 0.98 as per the standard Proctor sample. In areas with limited traffic and loads (group 1 and group 2), soil density should reach a ratio > 0.95 , according to the standard Proctor sample. The raising/stem pipe should be separated with a min. 5 cm wide structural gap (free space between the top of the pipe and the upper surface of a relief element). It is advisable to make a sealing between the outer wall of the stem pipe and the inner surface of the relief element.

In the event of changes in the surface level, after adjusting the plastic well, according to the recommendations of its manufacturer, you can make an additional adjustment, using compensation rings placed on relieving elements.

Recyclate plastic non-drive-on and protective covers can be installed on and around elevated concrete or plastic sewage, drainage, water meter or teletechnical water wells located in areas not exposed to vehicle or pedestrian traffic. The system should be made in a manner that ensures tightness of the top, stability of the foundation and safety of use.

For water meter and telecommunication wells, protective covers are equipped with a protective thermal insulation layer up to 120 mm thick.

Diagrams of the foundation elements for the recycled plastic surface toppings for the "TVR T System" sewage wells are presented in the Attachment.

The construction product should be used in compliance with its intended use, the scope and conditions that were specified in the National Technical Assessment and in technical and engineering regulations applicable to individual types of structures in communication engineering.

Before applying a construction product in a manner inconsistent with technical and engineering regulations, it is necessary to obtain a permission to deviate from those provisions, following the procedure specified in art. 9 of the Act of 7 July 1994 the Construction Law (cons. text: Journal of Laws of 2021, item 2351, as amended).

2.4. Conditions for use, assembly and maintenance

The conditions for use, installation and maintenance should comply with the manufacturer's recommendations and instructions.

3 FUNCTIONAL PROPERTIES OF THE CONSTRUCTION PRODUCT AND THE METHODS USED IN THEIR ASSESSMENT

The functional properties of the construction product are shown on the table below.

Table

Ea.	Description of a Construction Product	Critical Characteristics of the Construction Product to its Intended Application(s)	Functional Properties, Expressed in Levels, Classes or in a Descriptive Way	Unit	Testing and Calculation Methods
/	2	3	4	5	6
1	1. Rings	Hardness as per Shore	46 ±4	Sh' D	PN-EN ISO 868
2	2. Relief cones and plates 3. Adaptors for drains and manholes, compensators, supportive and protecting elements	Loads for class: - A15 - B125 - C250 - D400	> 15 > 125 >250 >400	kN	PN-EN 124-1
3	4. Non-drive-on and protective covers	Hardness as per Shore	46 ±4	Sh' D	PN-EN ISO 868
4		Loads	>2	kN	PN-EN 124-1

4. PACKING, TRANSPORT, STORAGE AND MARKING OF THE PRODUCT

4.1. Packing

Elements of near-surface recyclate plastic sewage well tops (TVR T System) should be packed on pallets to a height of not more than 2.0 m in a horizontal position and protected with color foil/stretch and tied with transport tape.

4.2 Storage, transport and loading

Elements of near-surface recyclate plastic sewage well tops (TVR T System) should be stored on pallets on an even, flat surface in roofed rooms and protected against the harmful effects of sunlight.

It is allowed to store them in open warehouse areas, however, the storage period (including storage at a construction site) should not exceed 1 year.

Elements of near-surface recycle plastic sewage well tops (TVR T System) should be transported in a horizontal position. When loading and unloading, be careful, protect against impact so as not to damage the products.

Elements of near-surface recycle plastic sewage well tops (TVR T System) should be transported by means of transport adjusted to their dimensions. During transport, they should be protected against sliding, pointed external pressure, deformation or impacts.

4.3. Method of marking a construction product

The product should be marked with a construction mark in accordance with the requirements set out in the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the method of declaring the functional properties of construction products and the method of marking them with a construction sign (Journal of Laws of 2016, item 1966, as amended).

Before marking the product with a building sign, it is necessary to prepare a national declaration of functional properties of a construction product, according to the formula published in Annex 2 to the abovementioned Regulation, and make it available as described in the Regulation.

The marking of the product should be accompanied by the following information:

- the last two digits of the year, in which the construction mark was first placed on the construction product,
- name and address of the manufacturer's registered office or an identification sign that allows one to determine clearly the name and address of the manufacturer's registered office,
- name and designation of the type of construction product,
- number and year of the National Technical Assessment, according to which the functional properties were declared,
- number of the national declaration of functional properties,
- level or class of declared functional properties,
- the name of the certification unit that participated in the assessment and verification of the permanence of the building product's functional properties,
- manufacturer's website address, if the national declaration of functional properties is available thereon.

5. ASSESSMENT AND VERIFICATION OF THE PERMANENCE OF FUNCTIONAL PROPERTIES

5.1. National system of assessment and verification of permanence of functional properties

Pursuant to Annex 1 to the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the method of declaring the functional properties of construction products and the method of marking them with a construction sign (Journal of Laws of 2016, item 1966, as amended), the construction product with the technical name: **elements of recycle plastic sewage well tops**, and its commercial name: **elements of near surface recycle plastic sewage well tops (TVR T System)**, is subject to the 4th national system of assessment and verification of permanence of functional properties.

The manufacturer's activities related to the assessment and verification of the permanence of the functional properties of the construction product are specified in § 4 of the abovementioned Regulation.

5.2. Determining the type of the construction product

The determination of the type of construction product includes assessment of the functional properties in relation to the basic characteristics and the intended application of this product, as specified in Chapter 3, and its identification properties, according to item 1.4.2 of this National Technical Assessment, until there are changes in raw materials, ingredients, production line or production plant.

5.3. Factory production control

The construction product, covered by this National Technical Assessment, should be produced in accordance with the company's production control system.

The manufacturer should prepare, document, implement and maintain a system of factory production control in order to ensure permanence of the construction product functional properties, as specified in this National Technical Assessment.

Documentation of the company's production control system should cover:

- a) organizational structure,
- b) requirements for the staff (qualifications, permissions, responsibility for individual elements of the company's production control system, training),
- c) internal audits, introduction of corrective and preventive measures,
- d) supervision over documentation and records,
- e) raw materials control and examination plans, requirements,
- f) plans for checking and examining the finished product,
- g) supervision over the production equipment,
- h) supervision over the equipment for control and tests, while maintaining the measuring compliance,
- i) supervision over the production process, including inter-operative inspections and tests,
- j) description of subcontracted works and procedures for their supervision,

- k) handling non-compliant products and complaints,
- l) description of packaging, transport and storage and the method of marking the product.

Documentation of the company's production control system should be supplemented with technical documentation, technical specifications (product standards, research standards, European or national technical assessments, etc.), law regulations.

The quality management system, used according to the requirements of PN-EN ISO 9001:2015-10, may be considered the company's production control system if the requirements of this National Technical Assessment are also met therein.

5.4. Research on finished products

5.4.1. Research Program

The finished product research program includes current tests.

5.4.2 Current tests

Current tests of finished products include checking:

- a) hardness as per Shore, according to the table, item 1 and item 3,
- b) loads, according to the table, item 2 and item 4,
- c) dimensions, according to item 1.4.2.

5.5 Taking samples for tests

Current test samples should be taken in accordance with the guidelines given in the company's production control system.

5.6 Testing frequency

For each series of the product, current tests should be performed in accordance with the testing plan, as set for in the company's production control documentation, but at least once a year. The size of the product series should be specified in the company's production control documentation.

5.7 Assessment of test results

The functional properties of the construction product are consistent with all the functional properties specified in this IBDiM's national technical assessment.

6. INSTRUCTION

- 6.1.**The national technical assessment is not a document authorizing anybody to provide a construction product with a construction marking.
- 6.2.**The national technical assessment may be repealed by the entity who issued it, on their own initiative or at a request from the Chief Construction Supervision Inspector, after conducting investigation with participation of the Applicant.

6.3.The national technical assessment does not violate any rights arising from the Act of 30 June 2000 “The Industrial Property Law (cons. text: Journal of Laws of 2021, item 324, as amended).

7. LIST OF DOCUMENTS USED IN THE PROCEEDINGS

In the procedure for issuing this national technical assessment the following documents were referred to:

7.1. Law regulations

- a) Act of 16 April 2004 on construction products (cons. text: Journal of Laws of 2021, item 1213, as amended);
- b) Act of 7 July 1994 “The Construction Law” (cons. text: Journal of Laws of 2021, item 2351, as amended);
- c) Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on national technical assessments (Journal of Laws of 2016, item 1968);
- d) Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the method of declaring functional properties of construction products and the method of marking them with a construction sign (Journal of Laws of 2016, item 1966) amended with the following regulations:
 - by Minister of Investment and Development of 13 June 2018 (Journal of Laws of 2018, item 1233);
 - by Minister of Investment and Development of 19 June 2019 (Journal of Laws of 2019, item 1176);
 - by Minister of Finance, Investment and Development of 21 October 2019 (Journal of Laws of 2019, item 2164);
 - by Minister of Development, Work and Technology of 4 December 2020 (Journal of Laws of 2020, item 2297);
 - by Minister of Development and Technology of 1 December 2021 (Journal of Laws of 2021, item 2260).

7.2. Polish Norms

- a) PN-EN 124-1: 2015-07 Tops of drains and manhole well to for surfaces for pedestrian and vehicle traffic - Part 1: Classification, general design principles, functional and testing requirements, testing methods and compliance assessment
- b) PN-EN 476: 2001 General requirements for elements used in gravitational sewage systems
- c) PN -EN 1504-3: 2006 Products and systems for protection and repair of concrete structures - definitions, requirements, quality control and compliance assessment - Part 3: Construction and non-construction repairs
- d) PN-EN 1610: 2015-10 Construction and testing of sewage ducts
- e) PN-EN 1917: 2004 Manhole and non-manhole wells, build of steel fiber and steel bar reinforced concrete

- f) PN-EN 13598-2: 2016-09 Plastic piping systems for underground non-pressure storm and sanitary sewage systems - Non-plasticized poly(vinyl chloride) (PVC), polypropylene (PP) and polyethylene (PE) - Part 2: Specifications of manhole and non-manhole wells
- g) PN -EN 15343: 2010 Plastics - Recycled plastics – Monitoring of recycling of plastics, assessment of compliance and recyclate content
- h) PN -EN 15344: 2010 Plastics - Recycled plastics - characteristics of recycled polyethylene (PE)
- i) PN -EN 15345: 2010 Plastics - Recycled plastics - characteristics of polypropylene (PP) from recycling
- j) PN -EN 15346: 2014-12 Plastics - Recycled plastics - characteristics of the recyclates of poly(vinyl chloride) (PVC)
- k) PN -EN ISO 868: 2005 Plastics and ebonite - determining hardness with the method of pressing, using a hardness meter (the Shore's method)
- l) PN -EN ISO 3126: 2006 Plastic piping systems - plastic elements - checking dimensions
- m) PN-EN ISO 9001: 2015-10 Quality management systems - Requirements

7.3. Reports from a construction product test

- a) Report on tests of strength of elements made from recycled plastics no 29/2022 TW-1, the Road and Bridge Research Institute, Wrocław Branch, Center for Research of Bridges, Concrete and Aggregates, Laboratory of Bridges and Dehydration Structures, Żmigród-Węglewo, 12.08.2022 .
- b) Research report No. GT/172/2022 Shore's D hardness. Research network: Łukasiewicz Institute of Polymer Materials and Dyes. The Gliwice Paint and Plastic Center. Research Laboratory of Polymer Plastics, 15.06.2022.
- c) Protocol on periodic control and strength tests of finished products no 01/PY/2022. EW INWEST, 24.03.2022

Attachment 1

To the hands of:

1. Applicant: **EW INWEST Eryk Wiśniewski**, address: ul. Warszawska 95, 74-200 Pырzyce - 1 copy.
2. a/a **Technical Evaluation Unit of the Road and Bridge Research Institute**, ul. Instytutowa 1, 03-302 Warsaw, Tel: (22) 39 00 221-227; e -mail: jot@ibdim.edu.pl -1 copy.

ATTACHMENT
Geometric characteristics

Characteristic dimensional and strength parameters of the elements of near-surface recycle plastic sewage well tops (TVR T System) are given in Table Z-1.

Table Z-1

Ea	Symbol	Marking	Inner diameter DN/ID	Height	Class
			[mm]	[mm]	
1	2	3	4	5	6
1	Tl	Tl/280/10	280,0 ±5	10,0 ±2	D400
		Tl/300/10	300,0 ±5	10,0 ±2	
		Tl/320/10	320,0 ±5	10, ±2	
		Tl/320/15	320,0 ±5	15,0 ±2	
		Tl/320/30	320,0 ±5	30,0 ±2	
		Tl/320/50	320,0 ±5	50,0 ±3	
		Tl/320/100	320,0 ±5	100,0 ±3	
		Tl/320/150	320,0 ±5	150,0 ±5	
2	Tl K	TlK/320/9/22	320,0 ±5	(9,0 ±2)/(22,0 ±2)	
		Tl/360/135	360,0 ±5	135,0 ±5	
3	Tl	Tl/3 70/30	370,0 ±5	30,0 ±3	D400
		Tl/390/20	390,0 ±5	135,0 ±3	
		Tl/390/40	390,0 ±5	40,0 ±3	
		Tl/3 90/60	390,0 ±5	60,0 ±3	
4	Tl ROK	TlROK/390/9/22	390,0 ±5	(9,0 ±2)/(22,0 ±2)	D400
5	TlRO	TlRO/3 90/15	390,0 ±5	15,0 ±3	D400
		TlRO/390/30	390,0 ±5	30,0 ±3	
		TlRO/390/50	390,0 ±5	50,0 ±3	
		TlRO/390/100	390,0 ±5	100,0 ±3	
6	Tl K	TlK/435/9/22	435,0 ±4	(9,0 ±2)/(22,0 ±2)	D400
7	Tl	Tl/435/10	435,0 ±5	10,0 ±2	D400
		Tl/435/15	435,0 ±5	15,0 ±2	
		Tl/435/30	435,0 ±5	30,0 ±2	
		Tl/435/50	435,0 ±5	50,0 ±3	
		Tl/435/100	435,0 ±5	100,0 ±3	
8	Tl K	TlK/500/9/22	500,0 ±5	(9,0 ±2)/(22,0 ±2)	
9	Tl	Tl/500/10	500,0 ±5	10,0 ±2	D400
		Tl/500/15	500,0 ±5	15,0 ±2	
		Tl/500/30	500,0 ±5	30,0 ±2	
		Tl/500/50	500,0 ±5	50,0 ±3	
		Tl/500/100	500,0 ±5	100,0 ±3	
10	Tl	Tl/550/400/180	(510,0 ±5)/(400,0 ±5)	180,0 ±4	B125
11	TlS	Tl/590/15/S	590,0 ±5	15,0 ±3	D400

		T1/415/15/S	415,0 ±5	15,0 ±3	D400
11	T1S	T1/310/15/S	310,0 ±5	15,0 ±3	D400
12	TI K	T1K/600/9/22	500,0 ±5	(9,0 ±2)/(22,0±2)	D400
13	TI	TI/600/10	600,0 ±5	10,0 ±2	
		TI/600/15	600,0 ±5	15,0 ±2	
		TI/600/30	600,0 ±5	30,0 ±2	
		TI/600/50	600,0 ±5	50,0 ±3	
		TI/600/100	600,0 ±5	100,0 ±3	
		TI/600/150	600,0 ±5	150,0 ±3	
14	T1KD	T1/600/9/22/D	600,0 ±5	(9,0 ±2)/(22,0 ±2)	
15		TI/600/10/D	600,0 ±5	10,0 ±3	
		TI/600/15/D	600,0 ±5	15,0 ±3	
		TI/600/30/D	600,0 ±5	30,0 ±3	
		TI/600/50/D	600,0 ±5	50,0 ±3	
		TI/600/100/D	600,0 ±5	100,0 ±3	
		TI/600/150/D	600,0 ±5	150,0 ±3	
16	TIK	T1K/610/9/22	610,0 ±5	(9,0 ±2)/(22,0 ±2)	
17	TI	TI/610/15	610,0 ±5	15,0 ±2	
		TI/610/30	610,0 ±5	30,0 ±3	
		TI/610/50	610,0 ±5	50,0 ±3	
		TI/610/100	610,0 ±5	100,0 ±3	
		TI/610/150	610,0 ±5	150,0 ±3	
18	TI	TI/610/480/185	480,0 ±5	185,0 ±4	
19	TIK	T1K/620/15/28	622,0 ±5	(15,0 ±3)/(28,0 ±3)	
20	TI	TI/620/15	622,0 ±5	15,0 ±3	
		TI/620/30	622,0 ±5	30,0 ±3	
		TI/620/50	622,0 ±5	50 ±3	
		TI/620/100	622,0 ±5	100,0 ±3	
21	TI K	T1K/625/9/22	625,0 ±5	(9,0 ±2)/(22,0±2)	
		T1K/625/30/60	625,0 ±5	(30,0 ±2)/(60,0 ±2)	
22	TI	TI/625/10	625,0 ±5	10,0 ±2	
		TI/625/15	625,0 ±5	15,0 ±3	
		TI/625/30	625,0 ±5	30,0 ±3	
		TI/625/40	625,0 ±5	40,0 ±3	
		TI/625/50	625,0 ±5	50,0 ±3	
		TI/625/60	625,0 ±5	60,0 ±3	
		TI/625/80	625,0 ±5	80,0 ±3	
		TI/625/100	625,0 ±5	100,0 ±3	
		TI/625/120	625,0 ±5	120,0 ±3	
		TI/625/150	625,0 ±5	150,0 ±4	
		TI/625/200	625,0 ±5	200,0 ±4	
23	TI K	TIK 635/30/60	635,0 ±5	(30 ±3)/(60±2)	D400
24	T1RK	T1RK/625/30/60	625,0 ±5	(30 ±3)/(60±2)	

25	TIR	T1R/625/40	625,0 ±5	40,0 ±3	D400
		T1R/625/60	625,0 ±5	60,0 ±3	
		T1R/625/80	625,0 ±5	80,0 ±3	
		T1R/625/100	625,0 ±5	100,0 ±3	
		T1R/625/120	625,0 ±5	120,0 ±3	
26	TIC	T1C/625/15	625,0 ±5	15,0 ±3	
		T1C/625/30	625,0 ±5	30,0 ±3	
		T1C/625/50	625,0 ±5	50,0 ±3	
		T1C/625/100	625,0 ±5	100,0 ±3	
		T1C/625/150	625,0 ±5	150,0 ±3	
27	TIK	T1K/640/9/22	640,0 ±5	(9,0 ±2)/(22 ±2)	
28	TI	Tl/640/10	640,0 ±5	10,0 ±3	
		Tl/640/15	640,0 ±5	15,0 ±3	
		Tl/640/30	640,0 ±5	30,0 ±3	
		Tl/640/50	640,0 ±5	50,0 ±3	
		Tl/640/100	640,0 ±5	100 ±3	
		Tl/640/C	640,0 ±5		
29	TIN	T1N/650/50	650,0 ±5	50,0 ±3	D400
		T1N/650/100	650,0 ±5	50,0 ±3	
30	TIK	T1K/700/9/22	700,0 ±5	(9,0 ±2)/(22 ±2)	
31	TI	Tl/700/15	700,0 ±5	15,0 ±2	D400
		Tl/700/30	700,0 ±5	30,0 ±2	
		Tl/700/50	700,0 ±5	50,0 ±3	
		Tl/700/100	700,0 ±5	100,0 ±3	
		Tl/700/150	700,0 ±5	150,0 ±3	
32	TIK	T1K/800/15/28	800,0 ±5	(15,0±2)/(28,0±2)	D400
33	TI	Tl/800/10	800,0 ±5	10,0 ±2	D400
		Tl/800/15	800,0 ±5	15,0 ±2	
		Tl 800/30	800,0 ±5	30,0 ±2	
		Tl 800/50	800,0 ±5	50,0 ±3	
		Tl 800/100	800,0 ±5	100,0 ±3	
		Tl 800/150	800,0 ±5	150,0 ±3	
34	TI	Tl/900/15	900,0 ±5	15,0 ±2	D400
		Tl/900/30	900,0 ±5	30,0 ±2	
		Tl/900/50	900,0 ±5	50,0 ±3	
		Tl/900/100	900,0 ±5	100,0 ±3	
		Tl/900/150	900,0 ±5	150,0 ±3	
35	TI	Tl/1000/30	1000,0 ±5	30,0 ±2	D400
		Tl/1000/50	1000,0 ±5	50,0 ±3	
		Tl/1000/100	1000,0 ±5	100,0 ±3	
		Tl/1000/150	1000,0 ±5	150,0 ±3	
		T2/320/10	320,0 ±5	10,0 ±2	D400
		T2/320/15	320,0 ±5	15,0 ±2	

36	T2	T2/320/30	320,0 ±5	30,0 ±2	D400		
		T2/320/50	320,0 ±5	50,0 ±3			
		T2/320/100	320,0 ±5	100,0 ±3			
37	T2	T2/320/150	320,0 ±5	150,0 ±3			
		T2/500/10	500,0 ±5	10,0 ±3			
		T2/500/15	500,0 ±5	15,0 ±3			
		T2/500/30	500,0 ±5	30,0 ±3			
		T2/500/50	500,0 ±5	50,0 ±3			
		T2/500/100	500,0 ±5	100,0 ±3			
38	T3	T3/315/A15	360,0 ±5	200,0 ±8		AI 5	
39	T3	T3/315/B125	360,0 ±5	200,0 ±8		B125	
40	T3	T3/315/D400	360,0 ±5	200,0 ±8		D400	
		T3/315/BB/UC	360,0 ±5	180,0 ±8			
		T3/315/CC	360,0 ±5	205,0 ±8			
		T3/315/R32	(315,0 ±5)/(360 ±5)	200,0 ±8			
41	T3	T3/400/B125	425,0 ±5	150,0 ±6	D400		
		T3/400/D400	425,0 ±5	150,0 ±6			
		T3/400/N	435,0 ±5	150,0 ±6			
		T3/400/425/BB/UC	480,0 ±5	230,0 ±6			
		T3/480/425/K	(480,0 ±5)/(425,0 ±5)	185,0 ±6			
		T3/480/425/T	(480,0 ±5)/(425,0 ±5)	185,0 ±6			
		T3/480/320	(480,0 ±5)/(320,0 ±5)	180,0 ±6			
		T3/425	500 ±5	200,0 ±8			
		T3/425/320	(320,0 ±5)/(500,0 ±5)	180,0 ±8			
		T3/410/700	(410,0 ±5)/(700,0 ±5)	185,0 ±8			
		T3/600/700	(600,0 ±5)/(700,0 ±5)	185,0 ±8			
		T3/600/650	(600,0 ±5)/(650,0 ±5)	190,0 ±8			
		T3/615	(615,0 ±5)/(700,0 ±5)	185,0 ±8			
		T3/615/650	(616,0 ±5)/(650,0 ±5)	210,0 ±8			
		T3/615/N	(615,0 ±5)/(715,0 ±5)	230,0 ±8			
				T3/635		635,0 ±5	185,0 ±8
				T3/680		680 ±5	200,0 ±8
		T3/680/625	(625,0 ±5)/(680 ±5)	200,0 ±8			
42	T4	T4/185	185,0 ±5	50,0 ±5	200kg		
		T4/315	360,0 ±5	50,0 ±5			
		T4/315/BB	310,0 ±5	130,0 ±5			
		T4/315/300	300,0 ±5	70,0 ±5			
		T4/315/400	395,0 ±5	60,0 ±5			
		T4/400	415,0 ±5	55,0 ±5			
		T4/400/P	405,0 ±2	130,0 ±5			
		T4/400/N	395,0 ±2	130,0 ±5			
		T4/400/425/BB	397,0 ±2	163,0 ±5			
		T4/425	490,0 ±5	55,0 ±5			
		T4/635	590,0 ±5	55,0 ±5			
		T4/600	580,0 ±5	70,0 ±5			
		T4/615	790,0 ±5	55,0 ±5			
				T4/IT/300		330,0 ±5	50,0 ±5

		T4/IT/400	430,0 ±5	50,0 ±5	
43	T5	T5/315/BB/UC	360,0 ±5	200,0 ±5	200kg
		T5/400/N	513,0 ±5	240,0 ±5	
		T5/400/425/BB/UC	485,0 ±5	262,0 ±5	
		T5/600/N	600,0 ±5	100,0 ±5	
		T5/600/DK	600,0 ±5	107,0 ±5	
		T5/800/100	800,0 ±5	100,0 ±5	
43	T5	T5/IT/300	300,0 ±5	90,0 ±5	200kg
		T5/IT/400	400,0 ±5	90,0 ±5	
44	T04	T04/600/315/70	315,0 ±5	70,0 ±8	D400
		T04/600/380/100	380,0 ±5	100,0 ±8	
		T04/600/450/75	450,0 ±5	75,0 ±8	
		T04/850/620/20	620,0 ±5	20,0 ±5	
		T04/850/620/50	620,0 ±5	50,0 ±5	
		T04/850/620/150	620,0 ±5	150,0 ±8	
		T04/850/620/170	620,0 ±5	170,0 ±8	
		T04/850/635/150	635,0 ±5	150,0 ±8	
		T04/900/630/120	630,0 ±5	120,0 ±6	
		T04/900/680/120	680,0 ±5	120,0 ±6	
		T04/1000/600/50	600,0 ±5	50,0 ±5	
		T04/1000/620/50	620,0 ±5	50,0 ±5	
		T04/1000/680/120	680,0 ±5	120,0 ±6	
		T04/1200/620/50	620,0 ±5	50,0 ±5	
45	T06	T06/UAS/315/BD	335,0 ±3	40,0 ±5	D400
		T06/700/435	435,0 ±5	30,0 ±5	
		T06/960/650	650,0 ±5	30,0 ±5	
		T06/960/715	715,0 ±5	50, ±5	
		T06/1050/680	680,0 ±5	20,0 ±5	
		T06/1100/680	680,0 ±5	130,0 ±5	
		T06/1000/640	640,0 ±5	180,0 ±5	
46	T08	T08/950/600/50	600,0 ±5	50,0 ±5	D400
		TO8/950/620/50	620,0 ±5	50,0 ±5	
47	ECO2	ECO2/1515/25	150,0 x 150,0 ±2	25,0 ±2	C250
		ECO2/1515/75	150,0x150,0 ±2	75,0 ±3	
		ECO2/1818/25	180,0 x 180,0 ±2	25,0 ±2	
		ECO2/1818/75	180,0 x 180,0 ±2	75,0 ±3	
		ECO2/2323/25	230,0 x230,0 ±2	25,0 ±2	D400
		ECO2/2323/75	230,0 x 230,0 ±2	75,0 ±3	
		ECO2/4328/25	430,0 x 280,0 ±3	25,0 ±2	
		ECO2/4328/50	430,0 x 280,0 ±3	50,0 ±3	
		ECO2/4328/75	430,0 x 280,0 ±3	75,0 ±3	
		ECO2/6145/25	610,0x455,0 ±3	25,0 ±2	
		ECO2/6145/75	610,0x455,0 ±3	75,0 ±3	
		ECO2/6161/25	610,0x610,0 ±3	25,0 ±2	
		ECO2/6161/75	610,0x610,0 ±3	75,0 ±3	
		ECO2/9161/25	915,0x610,0 ±5	25,0 ±2	
		ECO2/6191/75	915,0x610,0 ±5	75,0 ±3	
		ECO2/9191/25	915,0x915,0 ±5	25,0 ±2	

		ECO2/9191/75	915,0x915,0 ±5	75,0 ±3	
		ECO2/9161/75/N	915,0x610,0 ±5	75,0 ±3	
		ECO2/4328/BV	430,0 x 280,0 ±3	45,0 ±2	
		ECO2/4328/BH	430,0 x 280,0 ±3	45,0 ±2	
48	T6	T6/IT3030/15	300,0 x 300,0 ±3	15,0 ±2	C250
		T6/IT3030/25	300,0 x 300,0 ±3	25,0 ±2	
		T6/IT3030/50	300,0 x 300,0 ±3	50,0 ±3	
		T6/IT3030/75	300,0 x 300,0 ±3	75,0 ±4	

		T6/IT4040/15	400,0 x 400,0 ±3	15,0 ±2	D400		
		T6/IT4040/25	400,0 x 400,0 ±3	25,0 ±2			
		T6/IT4040/50	400,0 x 400,0 ±3	50,0 ±3			
		T6/IT4040/75	400,0 x 400,0 ±3	75,0 ±4			
		T6/IT5050/15	500,0 x 500,0 ±4	15,0 ±2			
		T6/IT5050/25	500,0 x 500,0 ±4	25,0 ±2			
		T6/IT5050/50	500,0 x 500,0 ±4	50,0 ±3			
		T6/IT5050/75	500,0 x 500,0 ±4	75,0 ±4			
		T6/IT/6040/15	600,0 x 400,0 ±5	15,0 ±2			
		T6/IT/6040/25	600,0 x 400,0 ±5	25,0 ±2			
		T6/IT/6040/50	600,0 x 400,0 ±5	50,0 ±2			
		T6/IT6060/15	600,0 x 600,0 ±5	15,0 ±2			
		T6/IT6060/25	600,0 x 600,0 ±5	25,0 ±2			
		T6/IT6060/50	600,0 x 600,0 ±5	50,0 ±3			
		T6/IT6060/75	600,0 x 600,0 ±5	75,0 ±4			
		T6/IT7070/15	700,0 x 700,0 ±5	15,0 ±2			
		T6/IT/7070/25	700,0 x 700,0 ±5	25,0 ±3			
		T6/IT/7070/50	700,0 x 700,0 ±5	50,0 ±4			
		T6/IT/7070/75	700,0 x 700,0 ±5	75,0 ±4			
		T6/IT/7050/15	700,0 x 500,0 ±5	15,0 ±2			
		T6/IT/7050/25	700,0 x 500,0 ±5	25,0 ±3			
		T6/IT/7050/50	700,0 x 500,0 ±5	50,0 ±3			
		T6/IT/7050/100	700,0 x 500,0 ±5	100,0 ±4			
49	TX	TX/4052/10B	(400,0 ±5) x (270 ±5)	54,0 ±3	D400		
		TX/4052/10B/20	(400,0 ±5) x (270 ±5)	20,0 ±3			
		TX/4052/10B/40	(400,0 ±5) x (270 ±5)	40,0 ±3			
		TX/4052/10B/60	(400,0 ±5) x (270 ±5)	60,0 ±5			
		TX/4052/10BG	(400,0 ±5) x (270 ±5)	90,0 ±6			
		TXK/4052/10B	(400,0 ±5) x (270 ±5)	(25,0 ±2) x (64,0 ±2)			
		TX/4052/10A	390,0 ±5	60,0 ±6			
		TX/4052/10A/20	390,0 ±5	20,0 ±4			
		TX/4052/10A/40	390,0 ±5	40,0 ±4			
		TX/4052/10AP	390,0 ±5	60,0 ±6			
		TX/5050/75	335,0 ±5	75,0 ±5			
		TX/6060/75	435,0 ±5	75,0 ±5			
				TX/650/395/80P	(395,0 ±5) / (270,0 ±5)	80,0 ±5	D400
				TX/650/395/W	(395,0 ±5) / (270,0 ±5)	90,0 ±5	
		TX/650/395/CW	(395,0 ±5) / (270,0 ±5)	90,0 ±5			
		TX/650/395/25	(395,0 ±5) / (270,0 ±5)	25,0 ±5			

		TX/650/395/50	$(395,0 \pm 5) / (270,0 \pm 5)$	$25,0 \pm 5$
		TX/765/395/80P	$395,0 \pm 5$	$80,0 \pm 5$
		TX/765/395/W	$395,0 \pm 5$	$90,0 \pm 5$
		TX/765/395/CW	$395,0 \pm 5$	$90,0 \pm 5$
		TX/765/410/80	$410,0 \pm 5$	$80,0 \pm 5$
		TX/765/420/80	$420,0 \pm 5$	$80,0 \pm 5$
		TX/765/500/80	$500,0 \pm 5$	$80,0 \pm 5$
		TX/765/420/470/BK	$(420,0 \pm 5) \times (470,0 \pm 5)$	$80,0 \pm 5$
		TX/315	$320,0 \pm 5$	$70,0 \pm 5$
		TX/425	$453,0 \pm 5$	$70,0 \pm 3$

		TX/400/600	$(400,0 \pm 5) \times (208,0 \pm 5)$	$80,0 \pm 3$	
		TX/420/620	$435,0 \pm 5$	$80,0 \pm 3$	
		TX/315/B125/PWB	$335,0 \pm 5$	$111,0 \pm 4$	
		TX/315/D400/PWD	$335,0 \pm 5$	$110,0 \pm 4$	
50	TXP	TXP/315/PN	$330,0 \pm 5$	$75,0 \pm 3$	
		TXP/315/PO	$350,0 \pm 5$	$75,0 \pm 3$	
		TXP/315/PK	$335,0 \pm 5$	$75,0 \pm 3$	
		TXP/370/75	$75,0 \pm 5$	$50,0 \pm 5$	
		TXP/370/100	$100,0 \pm 5$	$50,0 \pm 5$	
		TXP/370/120	$120,0 \pm 5$	$50,0 \pm 5$	
		TXP/370/120N	$120,0 \pm 5$	$20,0 \pm 5$	
		TXP/550/225	$225,0 \pm 5$	$40,0 \pm 5$	
		TXP/460/N	$425,0 \pm 5$	$70,0 \pm 5$	
		TXP/500/N	$425,0 \pm 5$	$80,0 \pm 5$	
51	TXO	TXO/315/PN	$330,0 \pm 5$	$90,0 \pm 5$	
		TXO/315/PO	$350,0 \pm 5$	$90,0 \pm 5$	
		TXO/315/N355U	$330,0 \pm 5$	$100,0 \pm 5$	
		TXO/315/M345U	$330,0 \pm 5$	$100,0 \pm 5$	
		TXO/340/125	$125,0 \pm 5$	$80,0 \pm 5$	
		TXO/340/135	$135,0 \pm 5$	$80,0 \pm 5$	
		TXO/340/145	$145,0 \pm 5$	$80,0 \pm 5$	
		TXO/340/153	$153,0 \pm 5$	$80,0 \pm 5$	
		TXO/340/195	$195,5 \pm 5$	$80,0 \pm 5$	
		TXO/340/205	$205,0 \pm 5$	$80,0 \pm 5$	
		TXO/340/125/K	$125,0 \pm 5$	$80,0 \pm 5$	
		TXO/340/195/K	$195,0 \pm 5$	$80,0 \pm 5$	
		TXO/340/200/K	$200,0 \pm 5$	$80,0 \pm 5$	
		TXO/365/265	$(365,0 \pm 2) / (265,0 \pm 2)$	$80,0 \pm 5$	
		TXO/375/275	$(375,0 \pm 2) / (275,0 \pm 2)$	$80,0 \pm 5$	
		TXO/400/195	$195,0 \pm 5$	$80,0 \pm 5$	
TXO/1100/785	$785,0 \pm 6$	$90,0 \pm 8$			
52	TXS	TXS/645/75/N	$645,0 \pm 5$	$75,0 \pm 5$	D400
		TXS/645/125/N	$645,0 \pm 5$	$125,0 \pm 5$	
		TXS/635/80	$635,0 \pm 5$	$80,0 \pm 3$	
		TXS/635/80/N	$635,0 \pm 6$	$80,0 \pm 5$	
		TXS/650/45	$650,0 \pm 6$	$45,0 \pm 3$	

		TXS/650/90	650,0 ±6	90,0 ±5	
		TXS/650/140A	650,0 ±6	140,0 ±5	
		TXS/650/140B	650,0 ±6	140,0 ±5	
		TXS/650/140C	650,0 ±6	140,0 ±5	
		TXS/675/90	650,0 ±6	90,0 ±5	
		TXS/685/90	685,0 ±6	90,0 ±5	
		TXS/700/50	700,0 ±6	50,0 ±5	
		TXS/700/80	700,0 ±6	80,0 ±5	
		TXS/715/80	715,0 ±6	80,0 ±5	
		TXS/820/80	820,0 ±6	80,0 ±5	
53	TR	TR/300	300,0 ±5	60,0 ±5	400
		TR/320	320,0 ±5	60,0 ±5	

		TR/400	400,0 ±5	60,0 ±5	
54	TXK	TXK/395/130	395,0 ±5	130,0 ±5	D400
		TXK/395/170	395,0 ±5	170,0 ±5	
		TXK/500/150	395,0 ±5	150,0 ±5	

If agreed so with the client, the elements can have different diameters and heights below 250 mm. Cones, plates, relieving rings, as well as adaptors for manholes and drains can be made with holes located centrally or eccentrically. Holes in foundation elements (plates), supporting or protective elements may have square, rectangular, round or oval holes, fitted to the tops of the manhole or drain well topping stems and can be reproduced on elements directly supporting them (to ensure tightness)

Diagrams of founding of the elements of near-surface recycled plastic sewage well tops (TVR T System) type 1, type 2, type 3 are presented in the 1-9 construction diagrams and drawings from Z-1 to Z-9.

Diagram 1

Diagram of the top of the near-surface street drain, consisting of prefabricated TVR T System – adjustment rings (type 1) T1, T1K wedge rings and an adapter for the drain (type 3) TX - foundation and description of the structural elements of the topping.

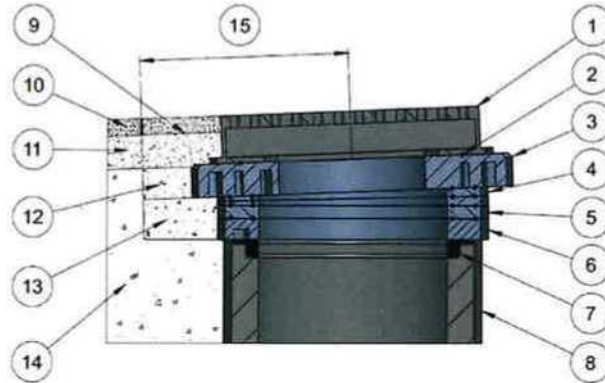


Figure Z-1 -Structure elements: 1) Cast iron street drain class D400, 2) polymer sealing and bonding mass applied between all elements of the topping, 3) adapter under the drain TX/765/410, 4) V -rings T1K/500/9/22 – 2 pcs., 5) adjusting ring T1/500/30, 6) adjusting ring T1/500/50, 7) repair and adjustment layer, 8) concrete ring DN 500, 9) bituminous and recreation layer, 10) wearing course of the bituminous layer, 11) load-bearing/binding layer of the bituminous layer, 12/13 substructure for the reconstruction road surface, made on the basis of poured compounds, 14) compacted, frost-resistant subgrade for the road surface, 15) road surface area to be removed during drain height adjustment.

Diagram 2

Diagram of the top of the near-surface sewage well, consisting of prefabricated TVR T System elements – adjustment rings (type 1) T1, T1K wedge rings - foundation and description of the structural elements of the topping.

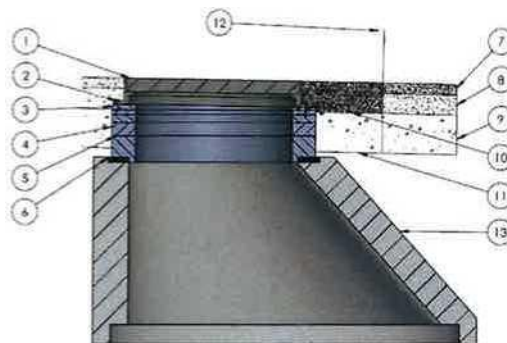


Figure Z-2 - Structure elements: 1) Cast iron street drain class D400, 2) fixing and anchoring manhole for adjustment rings, 3) wedge rings T1K/600/9/22 – 2 pcs., 4) adjustment rings T1/600/30 – 1 pcs, T1/600/50 – 1 pc., T1/600/100 – 1 pc, 5) polymer sealing and bonding mass applied between all elements of the topping, 6) repair and adjustment layer, 7) wearing course of the bituminous layer, 8) bonding layer of the bituminous layer, 9) 3) adapter under the drain TX/765/410, 4) V -rings T1K/500/9/22 – 2 pcs., 5) adjusting ring T1/500/30, 6) adjusting ring

T1/500/50, 7), binding layer of the bituminous layer 8) concrete ring DN 500, 9) bituminous and recreation layer, 10) frost-resistant subgrade for the road surface, 11) substructure for reconstruction of the road surface, 12) road surface area to be removed during height adjustment of the manhole well topping, 13) concrete reduction ring.

Diagram 3

Diagram of foundation of a self-leveling manhole on a near-surface topping, made from prefabricated TVR T System elements – adjustment rings (type 1) T1, a leading ring adapter (type 3) TXS - foundation and description of the structural elements of the topping.

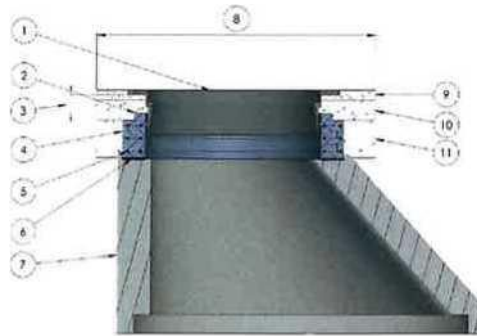


Figure Z-3 - Structure elements: 1) self-levelling manhole D400, resting on the road surface, 2) leading adapter/ring TXS/700/80 – 1 pc., 3) bituminous layer under the manhole flange, min 10cm thick, 4) adjustment rings T1/700/50 – 2 pcs, T1/700/30 – 1 pc., 5) polymer sealing and bonding mass applied between all elements of the topping, 6) repair and adjustment layer, 7) Cast iron street drain class D400, 2) fixing and anchoring manhole for adjustment rings, 3) wedge rings T1K/600/9/22 – 2 pcs., 4) adjustment rings T1/600/30 – 1 pcs, T1/600/50 – 1 pc., T1/600/100 – 1 pc, 5) polymer sealing and bonding mass applied between all elements of the topping, 6) repair and adjustment layer, 7) concrete reduction ring, 8) wearing course of the bituminous layer, 8) bonding layer of the bituminous layer, 9) road surface area to be removed during height adjustment of the well and installation of the near-surface topping, 9) wearing layer of the road surface, 10) load-bearing layer of the road surface, 11) frost-resistant subgrade for the road surface.

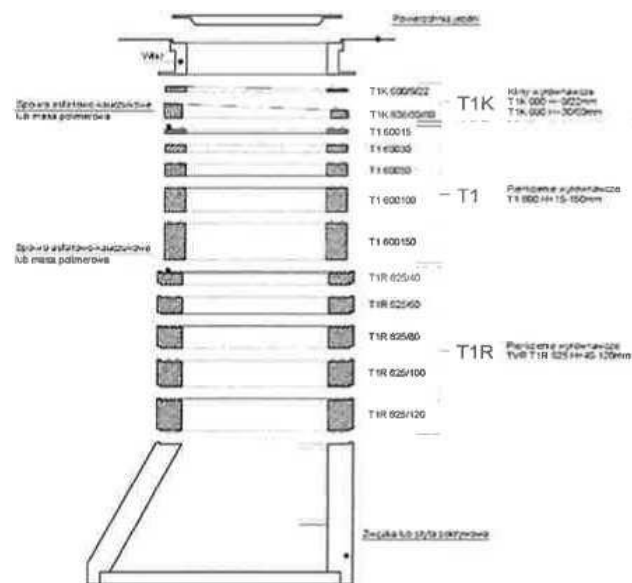
Diagram 4

Figure Z-4 – Founding of adjustment rings (type 1) T1/600, T1R/625, wedge rings T1K/600.

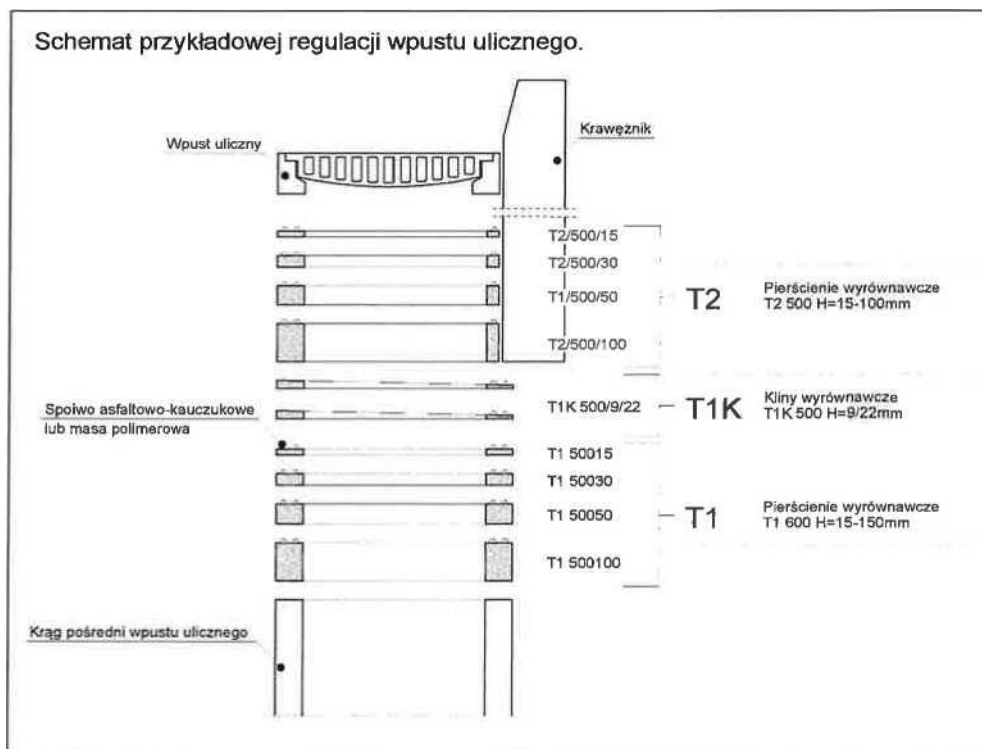
Diagram 5

Figure Z-5 Foundation of adjustment rings (type 1) of the T1/500 series, T2/500 wedge rings T1K/500/9/22.

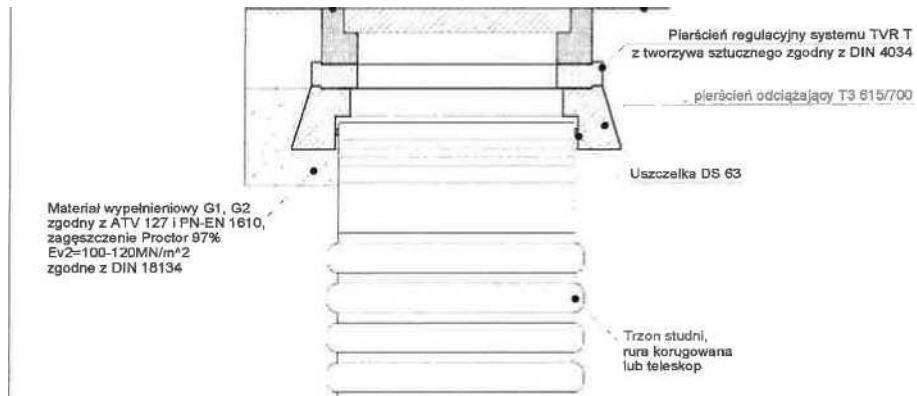
Diagram 6

Figure Z-6 - Foundation of a relief cone (type 2) T3/615 and the T1 adjustment ring.

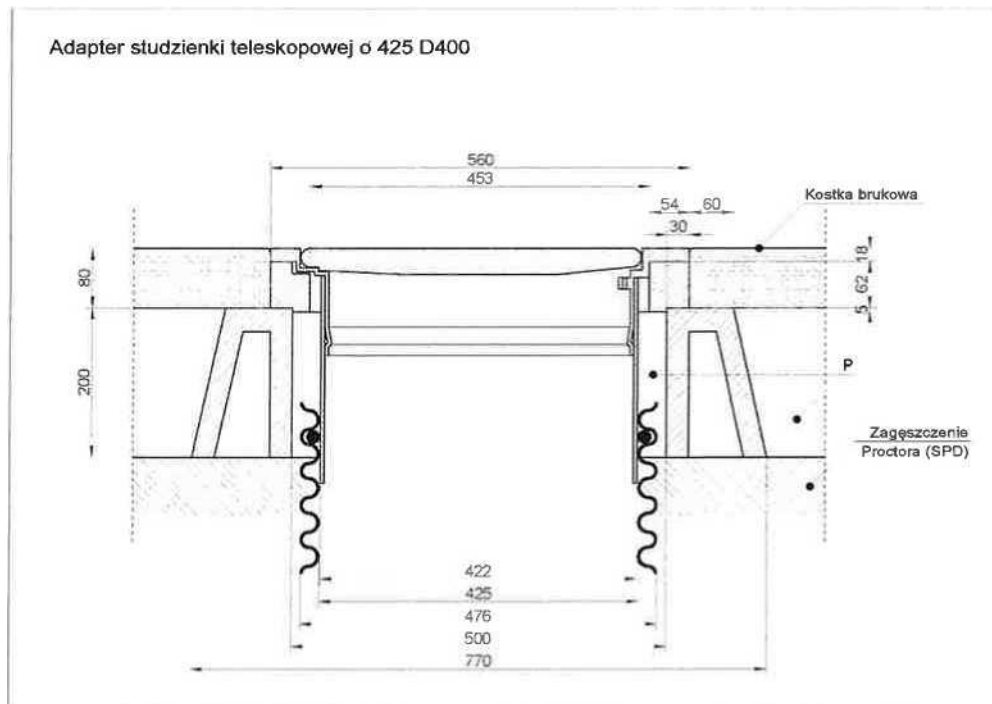
Diagram 7

Figure Z-7 - Foundation of an adapter (type 3) for a telescopic manhole 425 TX425, rested on a relief cone (type 2) T3/425.

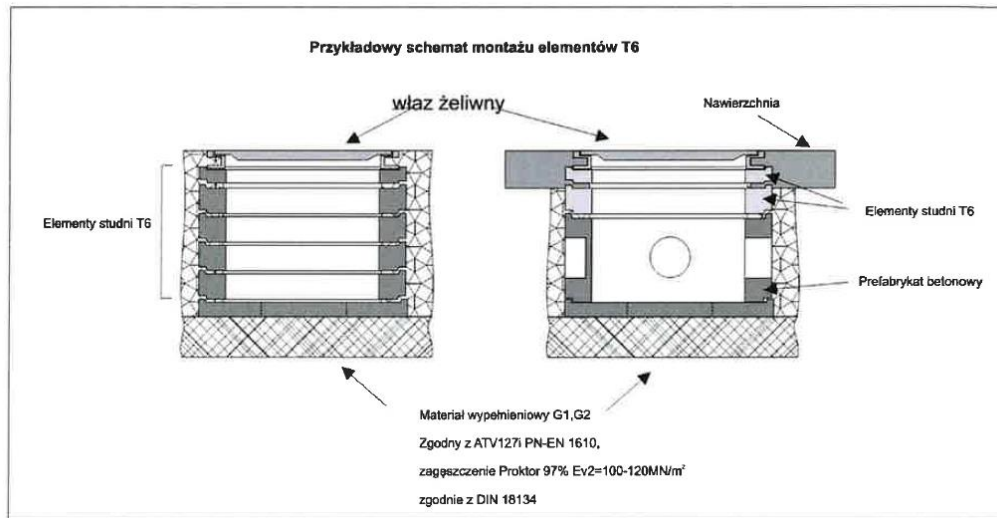
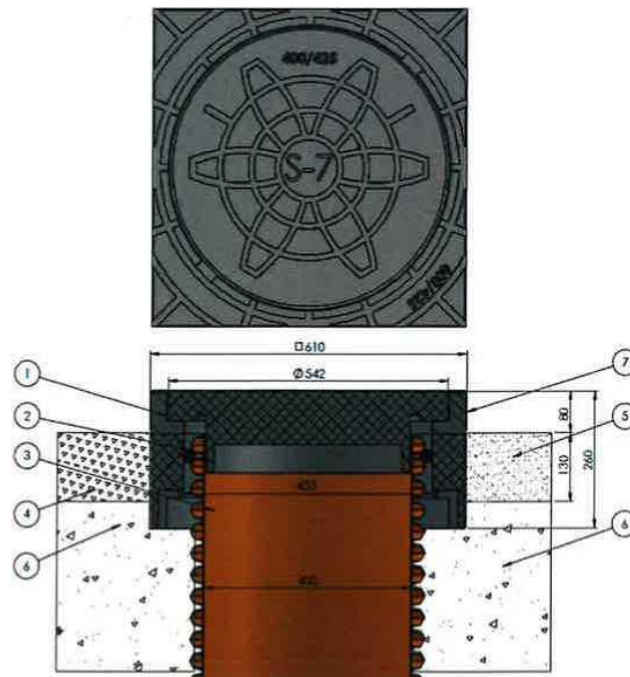
Diagram 8

Figure Z -8 - Founding of adjustment rings (type 1) in the shape of squares, and ECO2 adjustment rings in the water-meter well installation set.

Diagram 9

Diagram of the foundation of an elevated protective cover, with a non-drive-on cover on a



plastic rising pipe of a DN/ID400 well.

Figure Z-9. Diagram of foundation of a protective top T5/400/425/BB/UC. Construction elements: 1) Topping T5/400/425/BB/UC, resting on compacted soil, around the rising pipe; 2) gasket between the stem pipe and the topping; 3) SN4 DN/ID 400 stem pipe; 4) e.g. railway-type aggregate 5) e.g. native soil, 6) compacted sand fill 93-95% Proctor scale, 7) Note, the top is elevated 80 mm above the grade.