Present compay standard reprezent technical and quality conditions aplicable for production, qualtity control, packing, handling and transport of the KompactKIT® manholes and inspection chambers.

1 Commonness

1.1 Area of use

KompactKIT® manholes are used as cleaning and control chambers in gravitational sewage system.

1.2 Construction

Manholes s are compact products, bloc or composed from two segments combined by welding, produced through rotational molding technology. Collectors are provided with inlets and outlets or can be with closed base. Bloc collectors are single layer products and are made from high density polyethylene (HDPE). Manholes composed from segments have composite structure, made from compact and expanded HDPE (see 3.1).

Bloc construction and quality of raw material from which are manufactured collectors, confer them a very good resistance to corrosion and action of chemical agents. They also have a little weight and are easy to manipulate and install.

NOTES

1. Manholes are designed to be used for underground installation.
2. Manholes can't be used as overground or underground tanks for liquids storage, particular for fuels storage or other petroleum products.
3. Manholes can't be used for pressure sewage networks.

1.3 Conformity

The technical characteristics of the KompactKIT® manholes and inspection chambers meet the requirements of pr EN 13598–2: Piping Systems for non-pressure underground drainage and sewerage – Unplasticized polyvinyl chloride (PVC-U), polypropylene (PP) and polyethylene (PE) – Part 2 – Specifications for manholes and inspection chambers in traffic areas and deep underground installations.

VALROM Industrie declares that the properties of the KompactKIT® manholes and inspection chambers meet the technical specifications of the product and that the product is safe if used under the conditions specified by the manufacturer. Within the quality insurance system compliant with SR EN ISO 9001, all the necessary measures are taken in order to make sure that the manufacturing and testing ensure compliance of the product with the applicable technical documentation and that it meets all customer requirements.

2 Reference documents:

- prEN 13598–2: Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installations;
- SR EN ISO 1183–1: Plastics – Methods for determining the density of non-cellular plastics – Part 1: Immersion method, liquid pyknometer method and titration method;
- SR EN ISO 1183-2: Plastics – Methods for determining the density of non-cellular plastics – Part 2: Density gradient column method;
- SR EN ISO 1133: Plastics -- Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics
- SR EN ISO 527–1: Plastics -- Determination of tensile properties -- Part 1: General principles;
- SR EN ISO 527–2: Plastics -- Determination of tensile properties -- Part 2: Test conditions for moulding and extrusion plastics;
- SR EN ISO 178: Plastics -- Determination of flexural properties
- SR EN ISO 179: Plastics -- Determination of Charpy impact properties
- SR EN ISO 75–1: Plastics -- Determination of temperature of deflection under load -- Part 1: General test method
- SR EN 50086–1: Specification for Conduit systems for cable management Part 1: General requirements
- SR EN 50086–2–4: Specification for conduit systems for cable management. Part 2-4: Particular requirements. Conduit systems buried underground;
- EN 13101: Steps for underground man entry chambers — Requirements, marking, testing and evaluation of conformity.

- EN 14802: Plastic piping systems — Plastics shafts or risers for inspection chambers and manholes — Determination of resistance against surface and traffic loading.
- EN 14396: Fixed ladders for manholes.
- prEN 14830: Thermoplastics inspection chamber and manhole bases — Test methods for buckling resistance.
- EN ISO 1043-1: Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics.
- EN ISO 3126: Plastics piping systems — Plastics components — Determination of dimensions.
- EN ISO 4599: Plastics — Determination of resistance to environmental stress cracking (ESC) — Bent strip method.
- ENV 1046, Plastics piping and ducting systems – Systems outside building structures for the conveyance of water or sewage – Practices for installation above and below ground.

3 Characteristics

3.1 General characteristics

The material used for their manufacturing is high-density polyethylene (HDPE), in compliance with the requirements:

- EN 12666-1:2005: Plastics piping systems for non-pressure underground drainage and sewerage. Polyethylene (PE). Specifications for pipes, fittings and the system
- prEN 13476-1: Plastics piping systems for non-pressureunderground drainage and sewerage -Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP)and polyethylene (PE) - Part 1: General requirements and performance characteristics

The use of ground material of maximum 15% is permissible if such material is obtained following the technology used for manufacturing of manholes in compliance with the applicable operation sheets and if obtained from the same material as the one used for the basic production.

Manholes with maximum height of 3,000 mm are built as a single-layer block. Manholes with heights >3,000 have a composite structure, with overlapping layers as follows: one compact HDPE inner layer, one HDPE expanded layer and another compact HDPE layer. This structure reinforces the structure and allows the manhole to bear high mechanical loads.

3.2 Aspect

When examined with the naked eye (without magnifying instruments), the inner and outer surface must be smooth, clean and without flesh or defects that might affect product performance. Scratches with a maximum depth of 1 mm are admissible on its surface and deviations of maximum 3 mm from the concentricity of the segments. The sockets that constitute the inlets and outlets must be annular and without flesh on the mould clamping plane.

3.3 Format and dimensions

Manholes are produced in 5 constructive type:

- Closed base
- 3 inlets and 1 outlet (Ø160, 200, 250 şi 315), at 45°
- 3 inlets and 1 outlet (Ø160, 200, 250 şi 315) at 90°
- 1 inlet and 1 outlet (Ø400 şi 500) la 1800
- 1 outlet (Ø160, 200, 250 şi 315)

Format and dimensions are indicated in appendix no.1. From production the manholes are provided with acces steps inside.

3.4 Physical and mechanical characteristics

Characteristics determined on raw material (1, 2) and finished products (3÷6):

No.	Characteristics	Testing method	Value	UM
1	Density	SR EN ISO 1183	min. 0,939	g/cm³
2	Melt mass flow index[1]	SR EN ISO 1133	max. 4,0	g/10 min
3	Deflection temperature under load	SR EN ISO 75–2	min. 45	°C
4	Limiting creep stress	SR EN ISO 527	min. 15	MPa
5	Bending modulus	SR EN ISO 178	min. 700	MPa
6	Impact at low temperature	Standard ARM	min 100	J

[1] 5.0 kg at 190 °C

4 Marking, packaging, storage and transport

4.1 Marking

Manholes are marked in the factory, by stamping, with the manufacturing month (1÷12) and year (the last two digits).

NOTE

Marking can be modified according to the customer specification/requests.

4.2 Packaging

Manholes are delivered unpackaged.

4.3 Handling and transport

Within the loading/unloading operations and during transport, it is forbidden to knock down or hit with blunt or sharp objects that might cause surface defects (scratches, breakthroughs, etc.).

4.4 Storage

It is recommended to store them in sheltered places protected from direct radiation of the sun and bad weather. The maximum storage period may not exceed 18 months. In case of outdoor storage, the maximum storage period may not exceed 12 months as from the manufacturing day.

It is forbidden to pile manholes one on top of the other or to place loads on manholes during the whole storage period.

5 Warranty

The manufacturer offers a **24**-month warranty from date of delivery. The warranty covers manufacturing defects and does not cover defects caused by inadequate handling or mounting and or failure to observe commissioning instructions and norms. The estimated service life is 50 years.

6 Quality check conditions

Unless otherwise specified, all tests shall be performed under standard laboratory conditions in compliance with ISO 291:2005.

- The outer aspect is checked on minimum 20% of all production. If defects are found in more than 1 (one) manhole, then 100% of the production of the last 24 hours is checked;
- The physical and mechanical characteristics of the raw material are checked at random on each batch of minimum 10 tonnes of raw material used;
- The physical and mechanical characteristics of the finished product are checked on the first unit from commencement of production each quarter, but at least every 6 months.

7 Mounting instructions

1. Dig the construction hole so that there is a 30-40 cm empty space around the manhole walls. The floor of the construction hole must be flat.

2. Place a 15-cm layer of sand on the bottom of the hole and compact it.

3. Prepare the required fittings by simply cutting them on-site. If it is necessary to install ducts at other levels than the ones provided for the manhole, holes can be made in the side walls on the building site, using a drilling mill for a 110 – 125 – 160 – 200 – 250 mm diameters connections, the sealing being made by a connection seal.

4. The manhole is placed on the bottom of the hole using ropes tied on the handles. Make sure that it is placed in a stable position on the bottom of the hole.

5. The sewer pipes are connected to the manhole.

6. The clearance between the walls of the hole and the walls of the manhole is filled with 25-30 cm layers of fill material. Each layer must be carefully compacted, so that the whole clearance around the manhole is filled. The fill material shall be sand with 4/16 grain size or soil without stones, debris or other prominent particles that might scratch the walls of the manhole. The minimum compaction degree of the sand layer must be 85%.

Depending on the installation area, the minimum compaction degree is in compliance with the table below:

Manhole location	Minimum compaction degree (%)on the outline of the manhole	The last 0.5m-thick layer on the manhole under the foundation of the access way
Main road	85	95
Secondary road	85	90
Sidewalks and pedestrian trails	85	85

7. If the upper part for the control from 100 mm to 600 mm is also installed, there must be a filling layer of 20 to 80 cm above the upper wall of the manhole, depending on the height difference that is necessary to bring the manhole to the ground level. Finally, the remaining hole is filled with soil. The seal is mounted with the purpose of ensuring tightness between the manhole and the upper part. Moreover, a screw clamp is necessary for fixing it (the fixing part for manhole extension, VALROM code 47901000125).

Note: During installation of the manhole, it is recommended to keep it covered with a temporary protection cap (VALROM code 47901000006). The construction hole and the installation of the manhole must take into account the work safety norms.

8. If the manhole is mounted in areas where underground waters are present close to the surface (above the level of the base of the manhole), the manhole shall be placed on a concrete foundation dimensioned according to the hydro geological and static conditions of the ground (the thickness must correspond to the resistance of the sub-layer of soil) and shall be partially or totally covered with concrete, depending on the level of the underground water. If it is covered with concrete, with the purpose of compensating the pressure of the concrete laid on the manhole walls, it is necessary to prop its inner side with a board or to fill it with water. Before laying the concrete, water level is decreased by pumping below the level of the concrete apron.

9. The manhole is covered

a) If the manhole is installed in a green space – a non-carriageway area, the manhole can be covered with a temporary plastic cover, and sealed by mounting the seal into the dedicated slot made on the upper part, on the inner wall of the manhole;

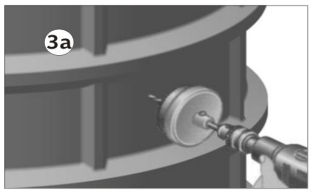
b) If the manhole is installed in a carriageway area, it is recommended to install a cast iron cover with a frame, according to the road category (minimum ultimate strength).

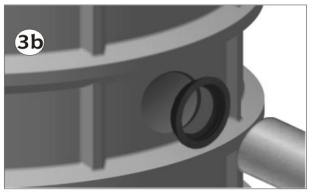
According to the minimum ultimate strength, covers are classified into the following groups, represented below, and systematized as in fig.9:

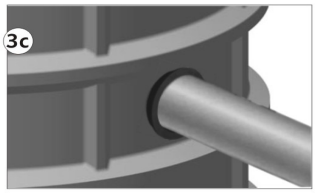
- Group 1 (min. class A15-minimum ultimate strength 15kN) for areas that may be exclusively used by pedestrians and cyclists;
- Group 2 (min. class B 125) for sidewalks, pedestrian areas and comparable areas, stop areas and multi-floor parking for cars;
- Group 3 (min. class C 250) for covering devices mounted in the area of street gutters along sidewalks, which, from the kerb, measures max. 0.5 m across the runway and 0.2 m across the sidewalk;
- Group 4 (min. class D 400) for runways in the streets (including pedestrian streets) stabilized road shoulders and stop areas for all the types of vehicles.

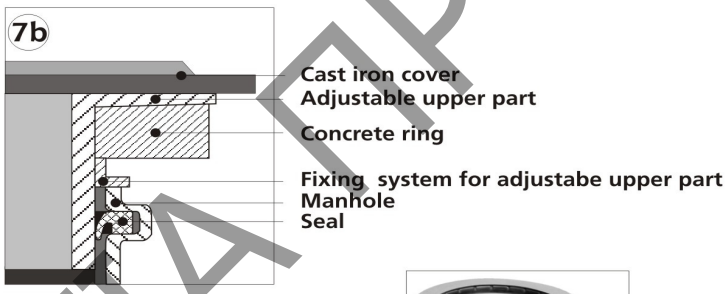
Cast iron covers must be mounted in compliance with the applicable national norms. The cast iron covers with frames are mounted on the upper adjustable part and are restrained in concrete or reinforced concrete, depending on the installation area, in compliance with the following recommendations:

- The annular support areas between the cover and the frame must ensure contact on the whole circumference. Before laying the concrete, all metal surfaces to which the concrete must adhere shall be cleaned from impurities. The upper face of the concrete laid into the cover must be either flat, level with the upper part of the metal part. If the area is to be laid with asphalt, the level to which the asphalt layer will be placed must be taken into account, in compliance with the fitting out project.
- The brand of the concrete must be B400, its frost cleftness degree must be G100 and the waterproof degree must be P8 and it must be made of crushed rock with the maximum size of 20 mm. For reinforcement of the concrete, appropriate reinforcing steel must be used (for example, for the covers corresponding to group 2 OB37 must be used).
- The installation of the cast iron covers must take into account the design and execution norms, as well as the applicable norms related to the safety at work.

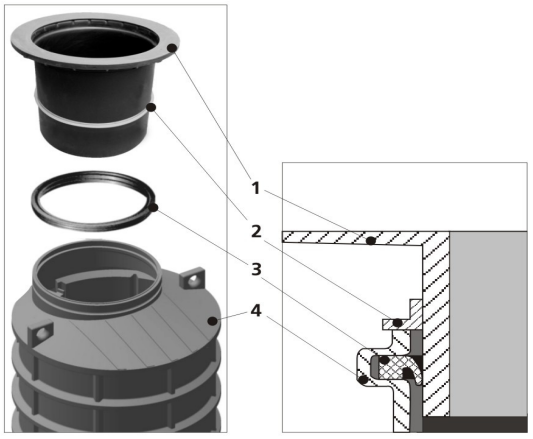


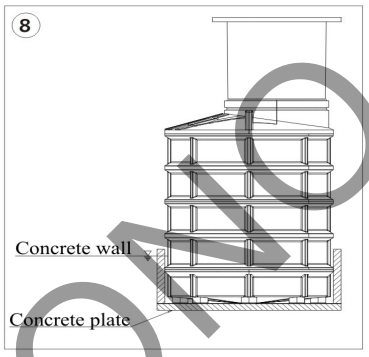


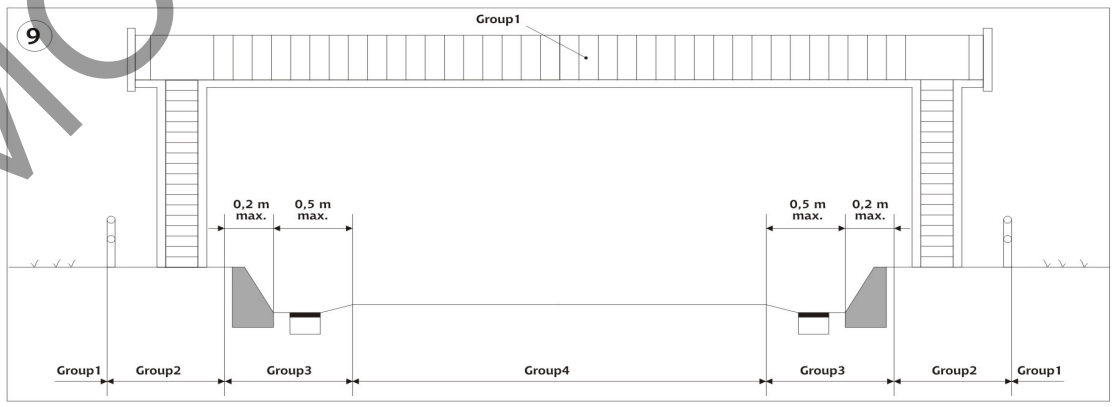




Seal installation details





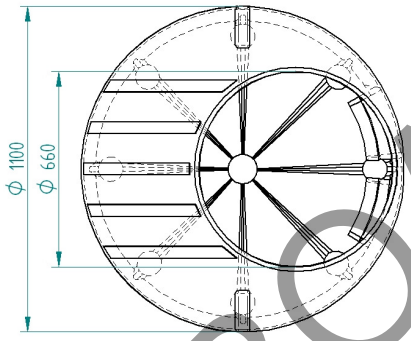


Street cross section for a typical street representing some groups of assembly seats

Appendix 1 — Geometry and dimensions

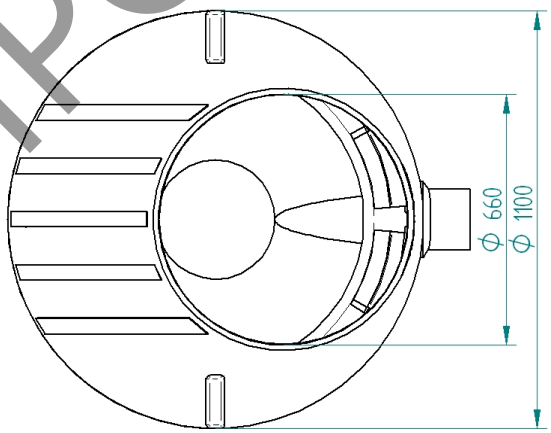
Closed base

Structure	H, mm
Single layer	750
	1.000
	1.500
	2.000
	2.500
Composite	3.000
	3.500
	4.000
	4.500



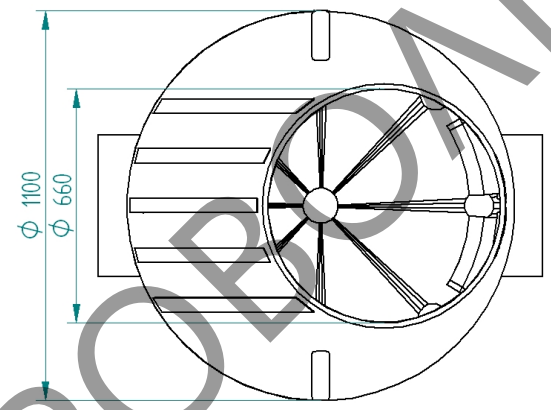
1 outlet

Ø, mm	Structure	H, mm
160×200	Single layer	750
		1.000
		1.500
		2.000
		2.500
	Composite	3.000
		3.500
		4.000
		4.500
315×250	Single layer	900
		1.200
		1.700
		2.200
		2.700
	Composite	3.200
		3.700
		4.200
		4.700



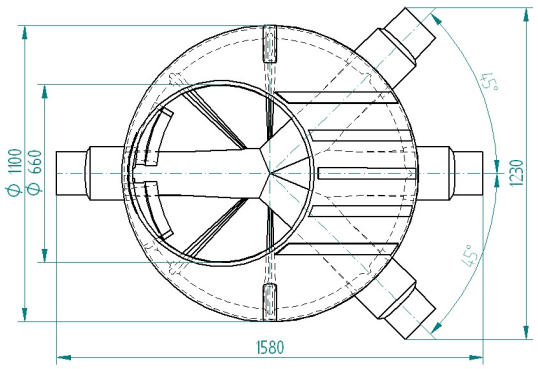
1 inlet + 1 outlet

Ø, mm	Structure	H, mm
400×400	Single layer	1.500
		2.000
		2.500
	Composite	3.000
		3.500
		4.000
		4.500
500×500	Single layer	1.500
		2.000
		2.500
	Composite	3.000
		3.500
		4.000
		4.500
400×500	Single layer	1.500
		2.000
		2.500
	Composite	3.000
		3.500
		4.000
		4.500



3 inlets + 1 outlet, at 45°

Ø, mm	Structure	H, mm
160×200	Single layer	750
		1.000
		1.500
		2.000
		2.500
	Composite	3.000
		3.500
		4.000
		4.500
250×315	Single layer	900
		1.200
		1.700
		2.200
		2.700
	Composite	3.200
		3.700
		4.200
		4.700



3 inlets + 1 outlet, at 90°

Ø, mm	Structure	H, mm
250×315	Single layer	900
		1.200
		1.700
		2.200
		2.700
	Composite	3.200
		3.700
		4.200
		4.700