TECHNICAL DATA SHEET

ViaCon Pecor Optima

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ViaCon Pecor Optima*

The Pecor Optima system is manufactured in compliance with EN 13476-1, EN 13476-3 standards.

DESCRIPTION

Pecor Optima pipes are manufactured from polyethylene (HDPE) and consist of two walls, where the outer wall is spiral corrugated to provide high ring stiffness of SN6/SN8/SN10(6/8/10 kPa), and the inner wall is smooth to guarantee optimal flow conditions. Pecor Optima pipes are manufactured in DN/ID diameter range from 300 mm to 1400 mm.

INTENDED USE

- Road and railway culverts
- Animal-friendly culverts and culverts under forest roads
- Relining of existing culverts
- Industrial ventilation systems
- Agricultural ventilation systems

PRODUCT FEATURES AND ADVANTAGES

- No need to use heavy equipment for installation
- Diversity of solutions
- Quick and simple installation (low weight)
- Reduced transport costs
- Best mechanical and hydraulic properties
- Corrosion resistance

TECHNICAL PROPERTIES

Material

Pecor Optima pipes are made of polyethylene (HDPE). This material is characterised by outstanding mechanical properties, which translates to high ring stiffness of the pipe. Polyethylene is also characterised by high heat resistance (operating temperature up to 80°C), low surface roughness, and extremely high abrasion resistance.

Physical and mechanical characteristics of polyethylene pipes are provided below:

- Density: >0.942 g/cm^3 – EN ISO 1183
- Modulus of elasticity:
  min. 600-1100 MPa – EN ISO 178
  150 ÷ 300 [MPa]
- Ultimate elongation: >400 [%]
- Melt flow index MFI: 0,15 ÷ 0,50 [g/10min]
  for loading 2,16 kg
- Coefficient of linear thermal expansion:
  $\alpha = (1,5 \div 2,0) \times 10^{-4}$ [1/°C]
- Working temperature range: -30 ÷ +75 [°C]
- Ring flexibility:
- No damage at 30% deformation – EN ISO 13968

Pecor Optima pipes are manufactured with the use of polyethylene with paint to obtain the desired colour:

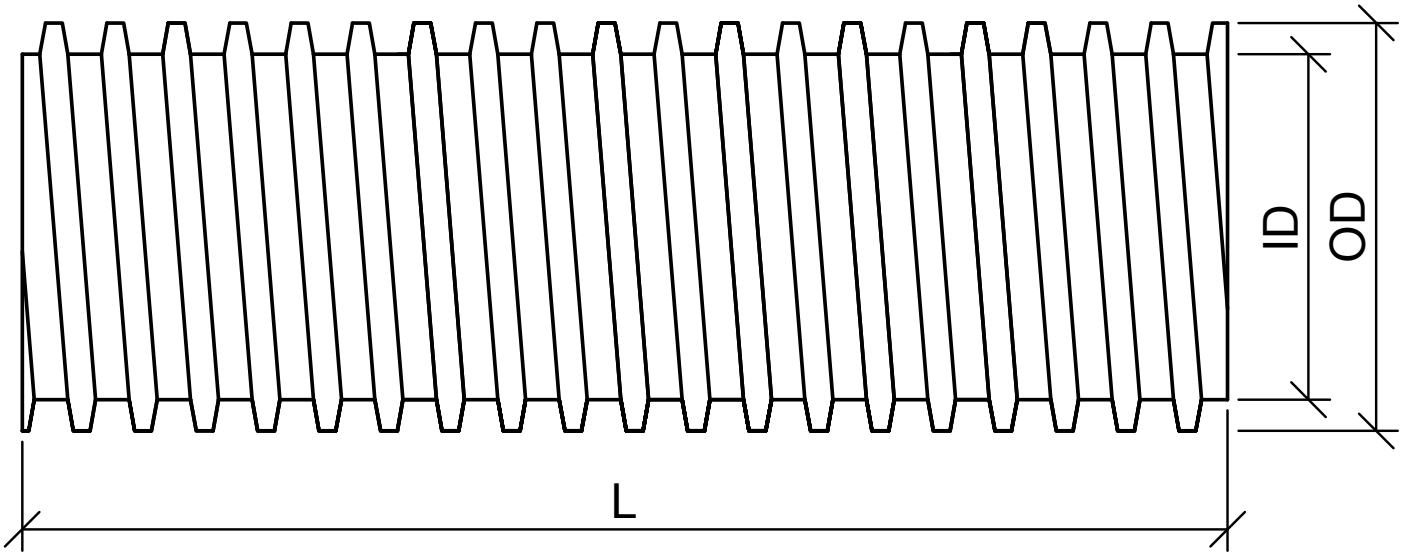
- Outer and inner wall: RAL 9004 black

As a standard Pecor Optima pipes are manufactured in black (black outer corrugated wall, and black inner wall).

The corrugation has not only a stiffening function but is also intended to achieve exact cooperation between pipes and the surrounding ground. The size of corrugation varies depending on pipe diameter.

THE DIMENSIONS AND TOLERANCES OF Pecor Optima

Nominal diameter DN [mm]	Inside diameter ID [mm]	Outside diameter OD [mm]	Length of an Pecor Optima pipe L [mm]		
300	304 ± 6 mm	363 ± 6 mm	6000	7000	8000
400	400 ± 8 mm	478 ± 8 mm	6000	7000	8000
500	506 ± 10 mm	594 ± 10 mm	6000	7000	8000
600	608 ± 12 mm	722 ± 12 mm	6000	7000	8000
800	800 ± 15 mm	970 ± 15 mm	6000	7000	8000
1000	994 ± 15 mm	1170 ± 15 mm	6000	7000	8000
1200	1194 ± 15 mm	1374 ± 15 mm	6000	7000	8000
1400	1389 ± 15 mm	1570 ± 15 mm	6000	7000	8000



PIPE'S ENDS FINISHING

Using Pecor Optima pipes enables an accurate adjustment of both ends to the slope and to required skew angle. Bevel cut can be done on one or both sides as a full bevel or step bevel.

It is recommended to use vertical step of 1/3 of the pipe diameter.

There are several possibilities of finishing the pipe's end:

- Reinforced concrete head wall
- Head wall made of gabions
- Slope paved with concrete or stone blocks placed on and-cement mix
- Slope paved with perforated concrete panels
- Slope paved with stone rip rap
- Reinforced concrete collar

CONNECTION OF Pecor Optima

Pecor Optima pipes are joined with coupling bands. There are two types of coupling bands: one-piece bands (Fig.1) and two-piece bands (Fig.2). Pecor Optima pipes including coupling bands create a sand-tight system.

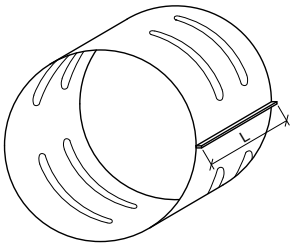


Fig.1

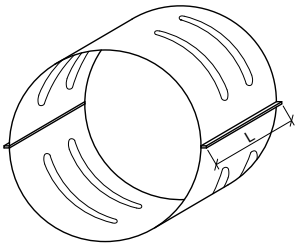


Fig.2

RING STIFFNESS OF Pecor Optima PIPES

Ring stiffness is the parameter that describes the strength and durability of Pecor Optima pipes. Pecor Optima pipes are manufactured in stiffness class SN6/SN8/SN10. Ring stiffness is a parameter that is declared by the producer for each manufactured batch of pipes. The declared nominal ring stiffness of a Pecor Optima pipe is the minimum guaranteed value for the given batch. Ring stiffness tests are performed by a company laboratory in order to determine the force required to deform the inner diameter of the pipe by 3%.

Ring stiffness is tested in compliance with EN ISO 9969.

Pecor Optima

PE-HD DN/ID800 ❄ SN8 EN13476-3

Description:

- ViaCon - Producer
- Pecor Optima - System name
- PE-HD - Material
- ID 800 - Nominal diameter
- SN8 - Ring stiffness
- ❄ - Impact resistance at -10 °C
- EN 13476-3 - Applicable standard

ELBOWS, T-PIPES AND MANHOLES

Pecor Optima pipes can be used for production of elbows and T-pipes. Standard elements are:

- Elbows : 15°, 30° , 45° (made of 2 welded elements), 90°- (made of three welded elements)
- T-pipes: 45° ,90°

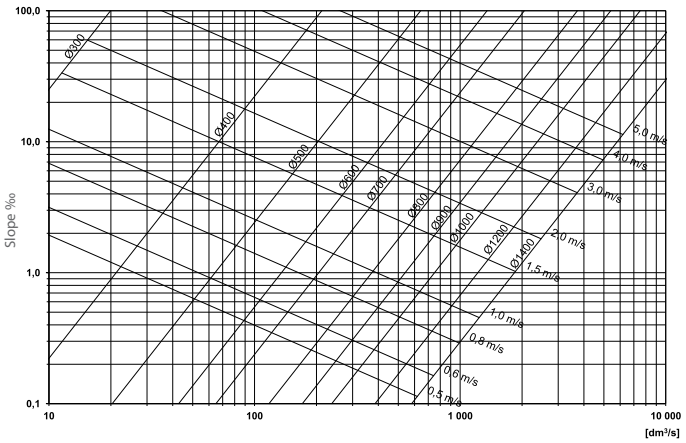
Upon request, these elements can also be produced in a nonstandard range of radii.

Manholes can be produced according to customer requirements/drawings, but these should be checked and confirmed by ViaCon.

HYDRAULIC PARAMETERS OF Pecor Optima PIPES

Diameter of the pipe should be determined on the basis of hydraulic calculation, depending on expected volume of flow. Figures below show the reference water flow Q_m for Pecor Optima pipes with cross-section filled at 75%.

Water-flow regulations may differ slightly depending on national standards.



Water flow Q_m for Pecor Optima pipes with cross-section filled at 75%.

COVER DEPTH

Cover depth can be described as a vertical distance between top of the pipe and the road grade line, including the road pavement. It is recommended (ENV 1046:2007 [11]) that the depth of cover should be not less than 0.6 m for all roads with traffic with a maximum vehicle weight of 40 tonnes. It is also recommended that the cover provides sufficient protection against pipe buoyancy in areas with high groundwater levels.

ASSEMBLY OF Pecor Optima PIPES

Pecor Optima pipes are easy to install. The assembly means placing the pipes in excavation and connecting them using coupling bands.

Pecor Optima pipes can be cut into any installation length.

BACKFILLING

- Backfill compaction should be carried out using light equipment (vibrating plates or jumping jacks). Heavy equipment is not allowed until the full backfill height is finished. Appropriate compaction in haunch area of the pipe is very important due to load bearing capacity of a culvert. Pipe should be stabilized during backfilling in order to keep the invariable position.

Requirements for backfill preparation:

- Backfill directly by the pipe should be at least half as wide as pipe diameter
- Backfill should be evenly distributed on both sides of the pipe, in loose

The grain size of the aggregate used for bed and backfill of the pipe (gravel, mine run, sand-gravel mix) depends on the size of the corrugation rings. For Pecor Optima pipes, the maximum recommended size of individual grains at the place of contact with the pipe wall and in its immediate vicinity (approx. 0.3 ÷ 0.5 m) is 31.5 mm. Larger grains are allowed in the remaining area, assuming that the following conditions are met:

- Uniformity coefficient $Cu \geq 4$
- Curvature coefficient $1 \leq Cc \leq 3$
- Other Cu and Cc parameters are allowed in terms of making a compaction sample on the jobsite*
- Backfill material should be compacted to minimum 0.98 of Standard Proctor Density, but for material directly by the pipe 0.95 of Standard Proctor Density is allowed.

TRANSPORT AND STORAGE

Transport

Pipes, fittings and connectors can be transported by any means adequate for their size. All the elements should be protected against displacement during transportation. The pipes should not be dragged but carried. Due to the risk of damage to the corrugation rings or other pieces during unloading, you must not drop the pipe from the truck, or use chains or steel cables for unloading.

Storage

Pecor Optima pipes should be stored on a flat surface in a horizontal orientation on wooden beams using wooden spacers between them as protection from rolling and deforming.

Pipes should be secured against displacement. Pipes, fittings and other elements of the system may be stored outdoors without any additional protection for 12 months from the date of production. If the storage period is longer, adequate protection against weather, e.g., UV radiation needs to be provided. If pipes, fittings and manholes are covered with tarpaulin that is non-permeable to light, adequate ventilation shall be provided. All elements should be protected against fire.

OTHER INFORMATION

Each application of Pecor Optima pipes requires a technical design, including estimated loads, hydrological conditions and other limiting outlines. Appropriate diameter of the cross section has to be chosen. The design should follow the guidelines issued by ViaCon as well as requirements of respective country.

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ViaCon is a leader in infrastructure construction solutions. Built on strong Nordic roots, ViaCon embodies a practical, human perspective that brings together technology and verifiable sustainability. The long-term view defines our vision, and by driving smart, future-friendly construction solutions for bridges and culverts, geotechnical and stormwater solutions, we will continue to shape and lead our industry.

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