Collection

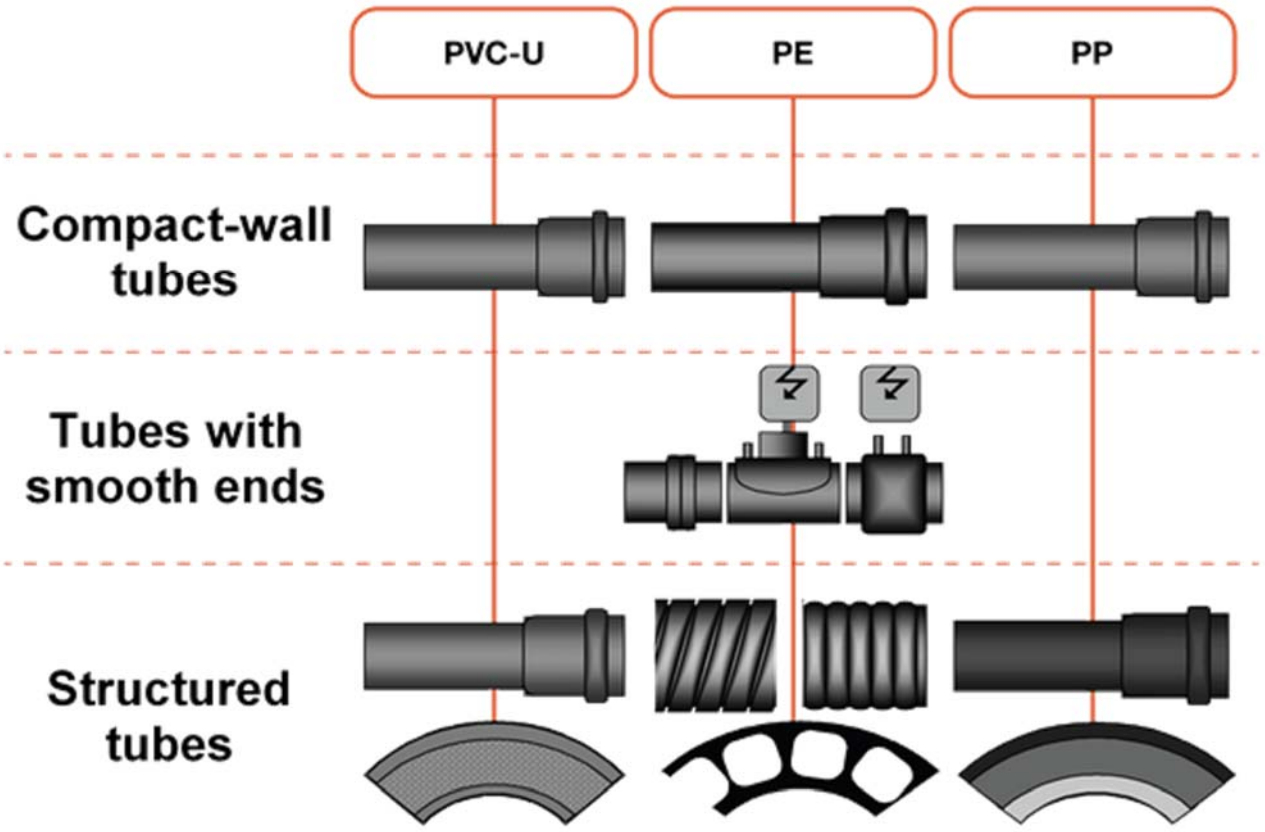
We offer many solutions in order to provide you with advice, and with the various plastic pipes available on the market: pipes made of polyvinyl chloride (PVC), of polypropylene (PP) and polyethylene (PE).

The three types of plastic pipes must comply with the European standards in application (EN1401 for compact PVC, EN 12666 for PE-HD, EN 1852 for PP-HM and EN 13476 for structured pipes).

SN2-structured pipes are not standardised.

The main standards for PVC, PP and PE pipe are as follows:

Compact PVC	EN 1401
PE-HD	EN 12666
PP-HM	EN 1852
Structured PVC-PE-PP	EN 13476



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Plastic pipes in construction

Choose the material that best suits your needs.

Historical

Canplast marketed PVC pipes in 1964, PE pipes in 1980 and PP pipes in 2005.

Properties of plastics

Raw materials

Polyethylene (PE) and polypropylene (PP) are produced from petroleum derivatives.
PVC is produced from salt (57%) as well as petroleum derivatives (43%). PVC is therefore more economical in fossil resources.

Volumetric mass density

Average values :
PVC : 1‘400 kg/m³ PE : 950 kg/m³ PP : 900 kg/m³

Modulus of elasticity

	PE	PP	PVC
Modulus of elasticity (value for 1 min)	**1‘000 N/mm²**	*1250 N/mm²* **1‘700 N/mm²** * *2800 N/mm²* **	**3’000 N/mm²**
Modulus of elasticity (long-term value)	**250 N/mm²**	*300 N/mm²* **425 N/mm²** * *700 N/mm²* **	**1’500 N/mm²**
Variation (%) Long-term/short term	**75%** loss	**75%** loss	**50%** loss

* for PP pipes with high modulus of elasticity (PP-HM)
** for multi-layer pipes reinforced with mineral substances

Long-term behavior is better for PVC..

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Roughness

PVC, PP and PE pipes have a very low roughness. It is important that manholes have the same qualities as pipes. This avoids the accumulation of deposits, reduces maintenance costs and facilitates cleaning. Our many years of experience help us ensure that the quality of internal surfaces of the pipes remains unchanged.

Before

After

Temperature of operation

As long as mechanical stresses are not excessive, the plastic pipes resist non-continuous use at the following temperatures :

PVC : 40 °C PE : 60 °C PP : 80 °C

Thermal expansion coefficients

Average values :
PVC : 0,08 mm/m·°K PE : 0,2 mm/m·°K PP : 0,14 mm/m·°K

The thermal expansion coefficients above indicate by how many millimeters a 1-meter-long pipe will lengthen or shorten when the temperature varies by plus or minus 1 degree Celsius or Kelvin.
When laying aerial plastic pipes, it is very important to take into account the expansion and positioning of the fixed points.
For buried M/F fitted pipes, we must not neglect the effects of the sun and temperature variations between day and night, in particular for PE.

Behaviour and resistance

Fire resistance

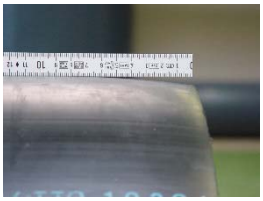
Hard PVC can burn but does not easily burn.
During a fire, PVC releases hydrochloric gas. It is recommended to use PVC pipes in buried or concrete-encased areas.
PE and PP are flammable.

Deformation under loads

The behaviour of PVC pipes in response to load is very good. For this material, it is not necessary to reinforce the structure with stainless steel rings when installing Straub® or Wall Collar system sealing joints.
The behaviour of PE pipes in response to load is poor. For this material, it is necessary to reinforce the structure with stainless steel rings when installing Straub® or Wall Collar system sealing joints.
The behaviour of PP-HM pipes in response to load is medium. For this material, it is recommended to reinforce the structure with stainless steel rings when installing Straub® or Wall Collar system sealing joints, on pipes of low rigidity..

Deformation at the extremities

During the extrusion of a pipe, and more particularly during its cooling, internal tensions are created in the material of the pipe. When cutting a pipe, the diameter decreases at its end. This phenomenon is very important for polyethylene, moderate for high modulus polypropylene and small for PVC. Precautions should be taken for PE and PP-HM when installing Straub® fittings.



Exemple : PE pipe Ø 630

Impact resistance

In general, the PVC, PP and PE pipes have an impact resistance which diminishes as the temperature decreases. PE is the product that is most resistant to impacts, followed by PP and compact PVC.
Structured PVC is much more fragile than compact PVC. For details, see "PVC pipes with M/F fitting and rubber seal" later in this chapter.

Chemical resistance

PVC, PP and PE pipes have a good chemical resistance. They are very appreciated for wastewater networks. For special cases with industrial water, it is necessary to know the nature of the liquids transported as well as their concentration and temperature. The chemical resistance of the joints must also be taken into account.

UV resistance

PE pipes are the most resistant to UV, provided they are black in colour. PE pipes of other colours are less resistant to UV.
PVC pipes whiten when exposed to sunlight. The colouring of PVC pipes is attacked by UV rays. This phenomenon is very superficial; it does not influence the resistance of the pipe.

Standardisation

European standards (EN)

The main standards for PVC, PP and PE pipe are as follows :

SN EN 1401 : Compact PVC for non-pressure underground collector
SN EN 1852 : Compact PP for non-pressure underground collector
SN EN 12666 : Compact PE for non-pressure underground collector
SN EN 13476 : Structured PVC, PP and PE for non-pressure underground collector

Rigidity class

The annular stiffness class **SN** (formerly **CR**) is a function of the modulus of elasticity of the material, the inertia of the wall of the pipe, as well as the average diameter of the pipe. The rigidity is expressed in kN/m ^{2}

$$CR=SN=\frac{E \cdot I}{Dm^3}$$

The most common rigidities are :
PVC : SN 2, SN 4, SN 8 and SN 0,5 for certain large diameters to be encased in concrete.
PE : SN 2, SN 4, SN 8
PP : SN 4, SN 8, SN 12, SN 16
If you need more rigid pipes, you can use “pressure” pipes.
The choice of rigidity is made according to recovery height and the traffic loads.

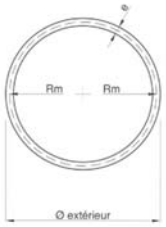
Pipe series

The theory is valid for all types of plastic pipes
Example : PVC SN 2

Old standardisation with "S25" designation. The old standard expressed the relationship between the average radius and the thickness of the pipe wall.

New standardisation with "SDR 51" designation. The current standard expresses the relationship between the outer diameter and the thickness of the pipe wall.

S 25 = SDR 51

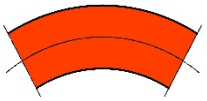


$$e=\frac{Rm}{25}$$

$$e=\frac{Ø\ ext.}{51}$$

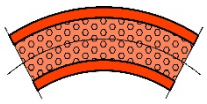
Differences between compact pipes and structured pipes

The standards governing compact pipes are more stringent than those governing structured pipes, especially for impact resistance. This means that the quality of the compact pipes is **much higher** than that of the structured pipes.

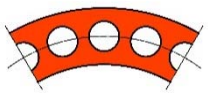


Cross section

EN 13476 covers all structured PVC, PE and PP pipes. In this category of pipes, the goal is **to save material**, without reducing the inertia of the pipe wall. **Warning !** According to **EN 13476**, the ring stiffness cannot be lower than **SN 4**. In Switzerland, many structured PVC pipes are sold with **SN2 rigidity, which is sub-standard.**

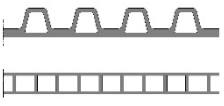


For PVC pipes, the economy can be realized in two different ways. The most common is to produce a three-layer pipe with a PVC foam core. The other method is to create longitudinal cells .



Cross section

For PE and PP pipes, the economy is often achieved by a hollow annular structure. The inside of the pipe is smooth. The outer face of the pipe is corrugated or smooth, depending on the manufacturing method .



Longitudinal section

Warning ! The corrugated pipes are manufactured according to two different standards. **DN-OD** means that the nominal Ø corresponds to the outer Ø. **DN-ID** means that the nominal Ø corresponds to the inner Ø. Due to the large thickness of the pipe wall, hydraulic section variation is important.

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Assembly

Bonding assembly

Only PVC is designed to make bonded joints. The contact area must be sufficient in order to ensure a good result. It must be clean and dry.
Bonding is difficult to achieve at low temperatures or in the presence of high humidity.

Welded joints

Only materials of the same type can be assembled by welding. For example, it is not possible to weld a PVC element to PE. The colour of the material is not an obstacle for the quality of the weld.

In order to weld the various plastics, it is essential to protect the welding element from rain, frost and wind, if the latter is too strong or cold.

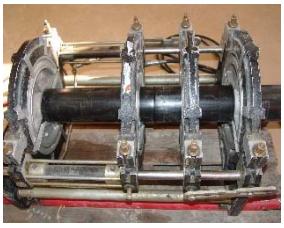
Welding types

There are several types of welds. Among the many techniques available, the most commonly used in the field of construction are :

- Mirror welding, also called polyfusion or end-to-end welding
- Electroweldable sleeve welding
- Hot air welding by adding material

Mirror welding

Mirror welding is widely used to join PE and PP pipes. This technique must be performed by qualified personnel. The welding machine is relatively bulky, it can be used in excavations or at the edge of the excavation. This process is especially interesting if the number of welds is important.



Although it is not standardised for PVC, this welding technique gives excellent results for specific applications carried out in the manufacture workshop.

Be aware that this welding method creates a small bead inside and outside the pipeline.

Electro-weldable sleeve welding

Electro-weldable sleeve welding is widely used to assemble PE pipes, whereas it is less common for PP pipes. This technique must be performed by qualified personnel. Many working phases are more difficult to master as part of this technique in comparison to mirror welding including scraping, cleanliness, ovality, scratches on the surface of the pipe, humidity, tolerance of dimensions, regularity of the energy source as well as voltages during welding.

The welding machine is compact; it can be used in excavations or for ceilings. Among other applications, this method is interesting for assembling prefabricated elements.

Welding with hot air by adding material

Hot air welding by adding material is mainly used in plastic boiler workshops. This technique also allows for on site repairs.

This type of equipment makes it possible to weld PVC, PE, and PP, among other materials. The filler material comes in triangular or circular rods. See also ‘PVC welding’ later in this chapter.

This type of extruder makes it possible to weld, among other materials, PE and PP. The filler material comes in granules. This system allows you to choose the width of the weld seam and access confined areas. See also ‘PE welding with Haering© extruder’ later in this chapter.

This type of gun-extruder makes it possible to weld, among other materials, PE, PP and PVC. The filler material comes in circular section wire. This system allows you to choose the width of the weld bead. See also ‘PE and PP welding with a gun-extruder’ later in this chapter.

Welding tests

Welds can be tested in different ways :

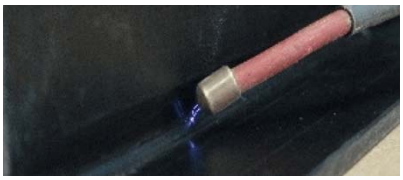
The water test consists of filling the manhole or tank with water and checking the tightness of the structure.

The pressure test is used to check the tightness and resistance of elements intended for gas distribution and drinking water.

The electric arc test can detect even the smallest defects. For this test, a metal element must be placed on the opposite side or inside the weld seam.

Electric arc test

Good weld

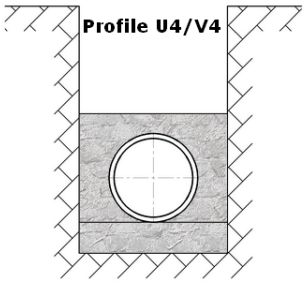


Defective weld

Implementation

Encasement of pipes

Encasement is done according to the requirements and standards in application.

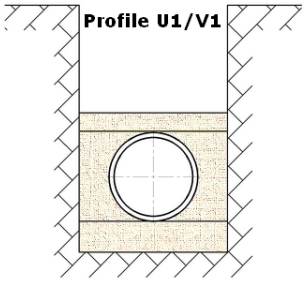


European standards concern only encasement with sand and gravel.
The SIA 190 standard offers two types of encasement :

- with gravel, profile U1/V1
- with concrete, profile U4/V4

Encasing the pipe with concrete is necessary in the following cases :

- When the calculation of deformations according to SIA 190 exceeds the authorised **5%**
- When required by **SN 592000** in the private sector
- When **recovery** is **low** and there is a risk of heavy traffic loads



Encasing the pipe with concrete is recommended in the following cases :

- When the **slope** of the pipeline is **low**, for example, less than 2%
- When the **slope** of the pipeline is **high**, for example, less than 10%

Warning ! The SIA 190 standard does not provide for partially concrete-encased plastic pipes. **The bedding**, which allows the bottom of the excavation to be well adjusted, **must not be made of concrete** with the rest of the gravel encasement. The plastic pipe cannot rest on a hard point.

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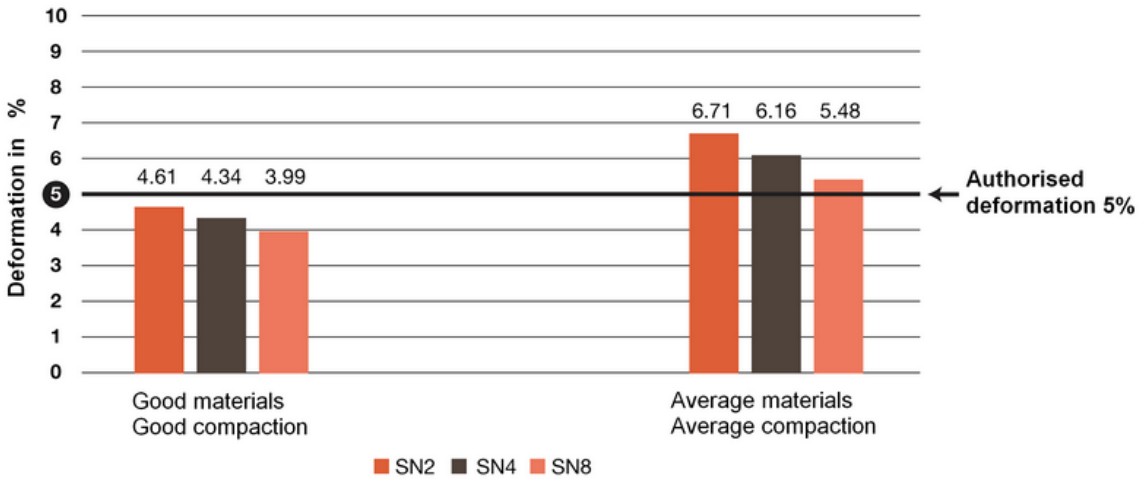
Importance of the encasement quality

Encasing the pipe with gritty materials requires special care :

- It is recommended to use materials that are easy to set up and compact.
- The excavation must be wide enough to allow good lateral compaction.
- The width of the excavation depends on the diameter of the pipe.
- To ensure good compaction, it is important to work in layers.
- The more rigid the pipe, the less likely it will deform during installation.
- The quality of compaction has a strong impact on the future deformation of the pipe.
- The choice of a pipe with a higher-rated rigidity factor is not a guarantee against deformation. The quality of the installation has more influence on the deformation than the nominal rigidity of the pipe. Example: at equal depth and at equal traffic loads, a well-embedded SN 2 pipe deforms less than an SN 8 pipe with a medium-quality encasement. The calculation of deformations according to SIA 190 highlights the importance of a good implementation.



The above table corresponds to a recovery height of 2.5 m with 1 + 2 + 3 traffic loads, according to SIA 160

Ecology

Eco-Devis/ Eco Bau

Since the **CRB** (Swiss Research Centre for Rationalization in Building and Civil Engineering) has created a classification system for materials according to ecology, polyethylene and polypropylene are very well ranked. A new reality that few practitioners know is the excellent position of the "new" PVC. Indeed, the replacement of lead stabilisation with calcium and zinc stearates or organic materials has changed the image of PVC. Since lead stabilisation has been discontinued, PVC has been classified as a highly recommended product. See also "Compact PVC pipes, environment-friendly " later in this chapter.

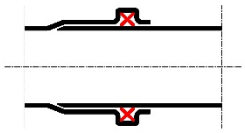
Recycling

Through the activity of its manufacture workshops, Canplast produces more than 70 tons of wastes per year. The plastics are sorted, cut into pieces and crushed. After various treatments these materials are reintroduced into new fabrications. See also " Recycling plastic material " later in this chapter.

The common installation errors to be avoided

Before going into a detailed presentation of the errors, we recommend that you carefully read the **EN 1610** standard which deals with the implementation of sanitation collectors. This standard defines, among other things, the storage of pipes, the excavation width, the thickness of the bedding, the height of the compaction layers, the quality of the encasing materials, the quality of the compaction, as well as tightness control**.**

Seals



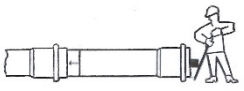
With the exception of corrugated pipes, the SN 2, SN 4 SN 8 PVC, PE or PP pipe series are all compatible. It is important not to mix joints of different sizes or manufacturers. Each seal fits only a particular sealing groove. It is not possible to guarantee tightness in the absence of a sealing joint, even if the pipe is encased in concrete.

Lubrication of joints

It is recommended to use the lubricant supplied by the pipe manufacturer**. Products based on mineral greases should not be used in any case**. These products can cause damage to neoprene joints and make them porous.

If the worker does not have a lubricant, he can use soft soap or liquid soap.

M/F Fitting



When connecting pipes or special parts such as elbows and branch lines, it is important that the thrust be exerted on the pipe axis. Any oblique fitting may cause the seal to come out of its groove.

When laying, it is recommended to visually assess that the sealing joint is in place. Finding and repairing a leak is very expensive.

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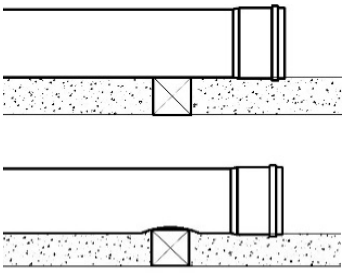
Setting up the bottom of the excavation

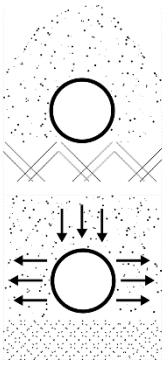
Areas where the bottom of the excavation has been reworked will need to be appropriately treated in order to restore initial load bearing capacity. The slope adjustment is very important when the slope is low. The wooden adjustment wedges allow the precise realisation of the bedding. These wedges must imperatively be removed after adjustment and replaced by a supply of material identical to that of the bedding.



The abandonment of the wedges at the bottom of the excavation causes a hard point under the pipe, which will punctually deform the pipe. This deformation can increase over time because the wood will swell with the moisture from the groundl.

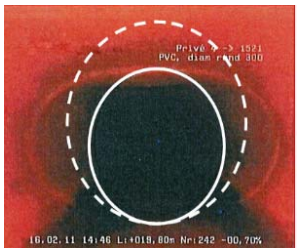
Positioning of the encasement

The pipe must be wedged and possibly ballasted in order to avoid any horizontal or vertical displacement.



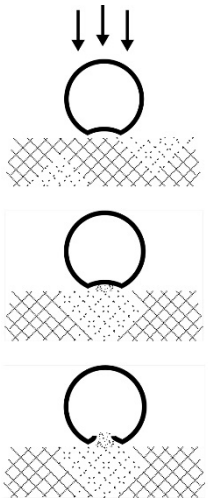
Compaction on both sides of the pipe is essential in order to limit the future deformation of the pipe under traffic loads.

Unloading too much gritty material on the pipe or compacting too quickly can cause a very important initial deformation



Inadequate encasement profile

It is not uncommon for a construction worker or construction supervisor, who is well-intended, to use concrete for the bedding in order to guarantee a perfect slope and to continue the encasement with gravelly materials in order to save on costs.



Plastic pipes (PVC, PE, PP) belong to the category of flexible pipes. Their encasement must be done according to SIA 190.

The realisation of a concrete bedding creates a hard point which concentrates the reaction of the ground under the base of the pipeline and deforms it.

A pebble on a concrete bedding will deform the base of the pipe during compaction. If the pipe is not very resistant to puncturing, the pipe may be perforated. In the case where the pipe is of higher quality, it will deform without perforation.

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Compact PVC pipes, environment-friendly

The main features of the new environmental-friendly compact PVC pipes stabilised in organic materials.

Context

The advancement of knowledge and production technologies now make it possible to manufacture PVC pipes without the addition of heavy metals. During manufacture, the hydrochloric acid produced by the process of dechlorination of the PVC molecule, damages the chemical structure of the molecule so causing a significant depletion of the mechanical characteristics. To avoid this phenomenon, the stabilisation of this acid is essential. In the past, stabilisation was achieved by adding lead or heavy metals. Nowadays, these old stabilisers have been replaced by organic stabilisers, which improves the properties of the PVC material and eliminates the ecological issues of heavy metals.

Application

Sewage, rainwater and drainage networks. Underground ventilation ducts and Canadian wells.

Standardisation

The **SIA 190** standard (2000 edition, page 23) requires, for PVC pipes without overpressure (gravity flow), the application of **SN EN 1401-1** standard. This standard is the most stringent for the manufacture of PVC pipe with **SN 2**, **SN 4** and **SN 8** rigidities. Structured PVC pipes are not allowed by the **EN 1401-1** standard.

Physical and mechanical characteristics

Specific weight	1’380 kg/m^3
Modulus of elasticity (value for a minute)	3’000 N/mm^2
Modulus of elasticity (long-term value)	1’500 N/mm^2
Tensile strength	20 N/mm^2
Average coefficient of longitudinal elongation	0.08 mm/m K
Ring stiffness available	SN2 (2 kN/m^2) SN4 (4 kN/m^2) SN8 (8 kN/m^2) SN12 (12 kN/m^2) SN16 (16 kN/m^2)

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Materials and ecology

Ecological PVC is distinguished from "traditional" PVC by its composition which no longer contains heavy metals.

PVC pipes stabilised with calcium and zinc stearate (PVC Ca-Zn) or organic stabilisers (OBS) are recommended by the Swiss Research Centre for Rationalization in Building and Civil Engineering (**CRB**). In the chapter of **CAN 237**, PVC Ca-Zn is classified in the best category with the mention "ecologically interesting." It is ranked equally with polyethylene (PE) and polypropylene (PP). Fiberglass-reinforced polyester pipes are not recommended.

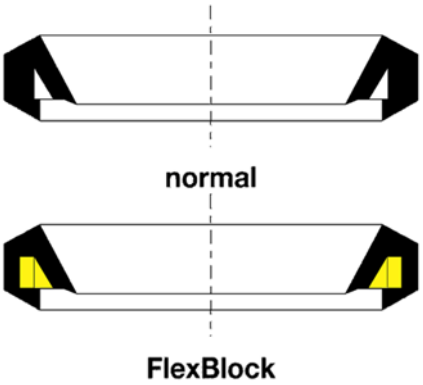
Assembly and sealing

The assembly is achieved by :

- Interlocking M/F fit directly integrated in the pipe. Male part : chamfered smooth end – Female part : interlocking tulip
- By double or sliding sleeve

Sealing is guaranteed by the traditional joint system or FlexBlock seals. The latter consists of a normal joint reinforced by a rigid ring that holds it in place. The advantages of the FlexBlock system are as follows :

- Non-removable and integral joint with the sleeve
- Absence of strangulation during assembly
- Safety of the result during implementation



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Depths of laying

The installation depths of the PVC, PE and PP pipes meet the criteria of the SIA 190 standard, in order to guarantee the structural strength and a maximum admissible deformation of 5% of the plastic pipes.

According to the SIA190 standard, the minimum covering height (H_laying) is 0.80 m.

Manufacturing program

Rigidity	SN 0.5	SN 2	SN 4	SN 8
Ref.	S 40	S 25	S 20	S 16.5
SDR	SDR 81	SDR 51	SDR 41	SDR34
DN OD in mm	Wall thickness in mm			
Ø 110			3.0	3.2
Ø 125			3.2	3.7
Ø 160		3.2	4.0	4.7
Ø 200		3.9	4.9	5.9
Ø 250		4.9	6.2	7.3
Ø 315		6.2	7.7	9.2
Ø 355		7.0	8.7	10.4
Ø 400		7.9	9.8	11.7
Ø 450		8.8	11.0	13.2
Ø 500		9.8	12.3	14.6
Ø 630	7.9	12.3	15.4	18.4
Ø 710	8.8	13.9	17.4	20.7
Ø 800	10.0	15.7	19.6	23.3
Ø 900	11.3	17.6	22.0	
Ø 1000	12.4	19.6	24.5	
Ø 1200	14.9	23.6		

	Compact PVC pipes according to **EN 1401**

Submission text

The texts of the CAN often lack precision. For submission, we recommend that you specify the **EN 1401** standard and its requirements in your text.

A condensed text could be summarised as follows :
« Compact PVC pipes stabilized with organic materials or Ca-Zn according to the EN 1401 standard, Canplast brand or similar ».

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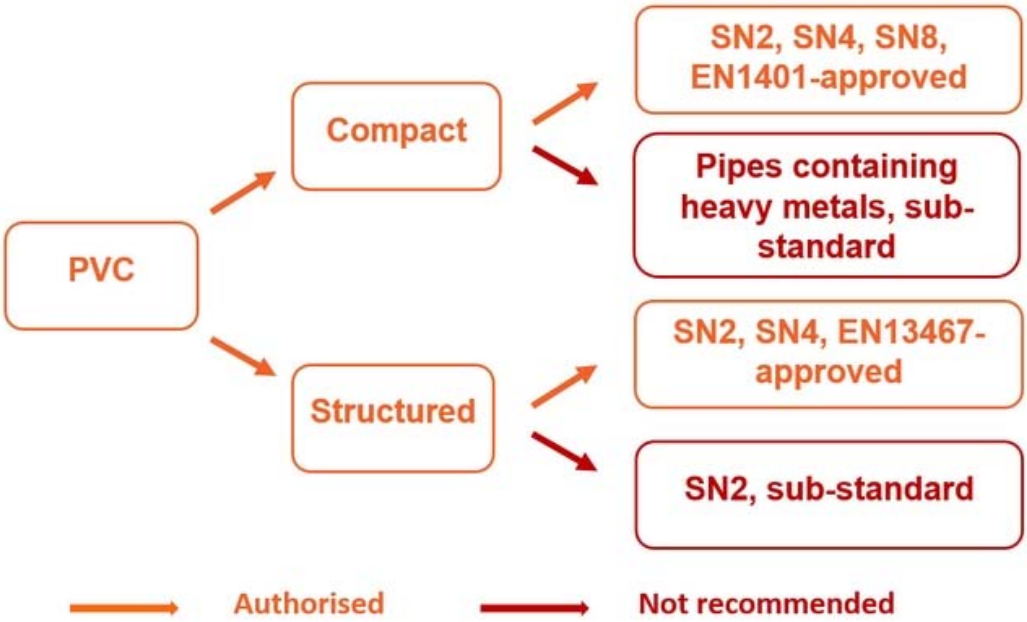
PVC pipes - with M/F fitting and rubber sealing joint

On the market, there are two PVC families namely compact PVC and structured PVC.

The standards governing compact pipes (**EN 1401**) are more stringent than those governing structured pipes (**EN13476**), in particular for impact resistance.
SIA 190, which deals with all flow plastic pipes, states that **only EN1401 is approved**.

Existing PVC plastic pipes program on the Swiss market

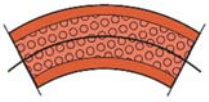


Compact PVC

Homogeneous compact PVC pipes comply with the **EN1401-1** and **SIA 190** standards.

Structured PVC

Structured PVCs comply with the EN13467 standard. The pipe is made in three layers with a PVC foam core. The cost of manufacturing this type of pipe is lower because the amount of raw material is reduced.



It should be noted that only the SN4 and SN8 rigidities are standardised up to Ø 500 mm. **SN2-structured pipes are not standardised.**

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Plastic pipe laying instructions

Scope

The SIA 190 (2000) standard, which defines the permissible installation depths according to the criteria taken into account in this technical data sheet, has been applied. This sheet is for guidance only and is to be used according to the actual parameters of the project.

Loads

The loads supported by the plastic pipes are specific to each project. The engineering planning office must define the possible load cases. According to SIA 160, two load cases are first defined according to the following models in order to verify structural safety and serviceability :

- Loads due to off-road traffic (load model 1)
- Charges due to traffic on the roadway (load model 1 + 2 + 3)

Encasement profile

The EN 1610 standard describes the execution and encasement of plastic pipe excavation in different profiles. The acceptable depth range is described in the depth of laying section.

- **U1/V1 profile** : Give priority to this type of profile for plastic pipes.
- **U4/V4 profile** : This type of profile is used for domestic drainage networks according to the SIA 190 and SN 592 000 standards.

Backfill#

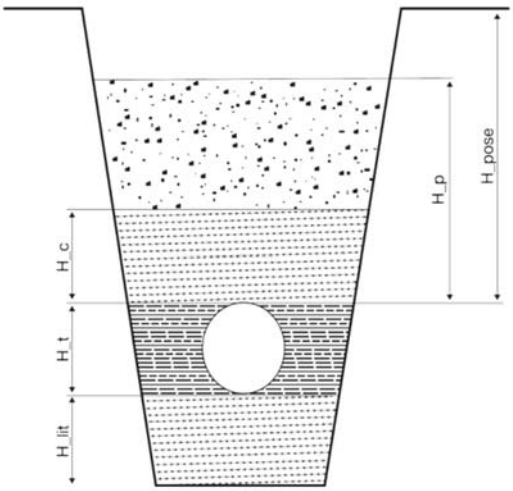

Figure 1 : V1 profile

1. **Bedding** with a minimum height (H_lit) of 10 cm of sand or gravel (grain size: 0 -16 mm).

2. The length of the **pipe** must rest completely on the bedding.

3. **Compact** in several layers with uncrushed gravel 0-16 mm in size, up to the top edge of the pipe (H_t) in order to ensure good compaction quality (guarantee lateral support).

4. Make a minimum height (H_c) **coverage** of 10 cm with uncrushed gravel (0-16 mm grain size).

5. Put in place a **protective layer** (H_p) with a minimum thickness of 30cm depending on the compaction.

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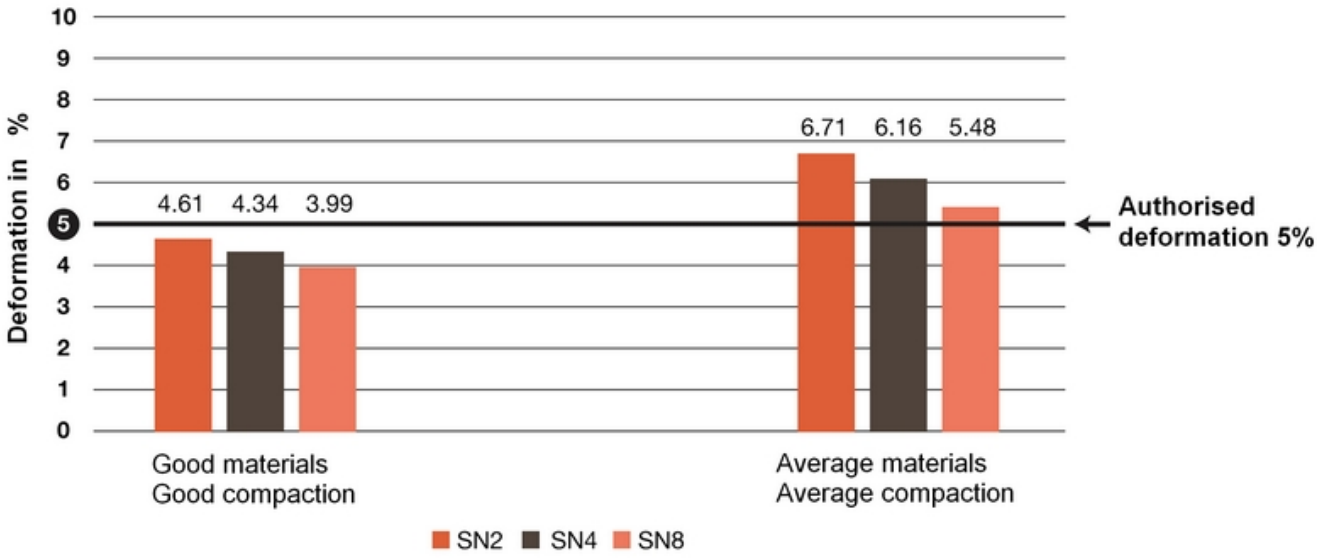
Static calculation

The static calculation, carried out according to the SIA 190 standard, checks the structural safety as well as the serviceability and takes into account the rigidity of the system, the characteristics of the construction materials, the encasement profile and the loads exerted.

- Terrain deformation module : 3 N/mm^2
- Volumetric mass density of the ground : 20 kN/m^3
- Support factor for flexible hose : 1.2
- Dynamic coefficient : 1.3
- Plastic pipe diameter : Ø 250 mm

The importance of compaction (exemples)

The influence of terrain quality and compaction is shown below. The calculation of the deformations was carried out according to the SIA 190 standard.



In the case of a good material and a good compaction, the pipe having the lowest rigidity (SN2 in this case) is allowed.

For average material and compaction, the pipe with the highest rigidity (SN8 in this case) will not be allowed.

The quality of the material and the compaction strongly influence the result of deformation.

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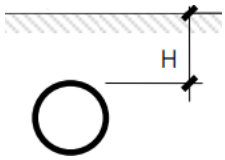
Depth of laying

The installation depths of the PVC, PE and PP pipes meet the criteria of the SIA 190 standard, in order to guarantee the structural strength and a maximum admissible deformation of 5% of the plastic pipes.

According to standard SIA190, the minimum covering height (H_laying) is 0.8 m.

The tables below define the allowable installation depths (H_laying), as an indication, depending on the type and rigidity of the pipe, the load profile and the quality of the encasement.



Indicative height **H**_laying in m	HARD PVC PIPES **COMPACT** Loads **OUTSIDE** traffic areas Load model 1 SIA 160 **U1/V1** profile			HARD PVC PIPES **COMPACT** Loads **INSIDE** traffic areas Load model 3 SIA 160 **U1/V1** profile		
	SDR 51 (S 25) **SN 2**	SDR 41 (S 20) **SN 4**	SDR 34 (S 16.5) **SN 8**	SDR 51 (S 25) **SN 2**	SDR 41 (S 20) **SN 4**	SDR 34 (S 16.5) **SN 8**
0.50						
0.60			**0.65**			
0.70		**0.75**				**0.70**
0.80	**0.80**				**0.80**	
0.90				**0.95**		
1.00						
.						
.						
.						
2.80				**2.75**		
2.90						
3.00						
3.10					**3.10**	
3.20	**3.20**					
3.30						
3.40						
3.50		**3.50**				**3.55**
3.60						
3.70						
3.80						
3.90			**3.90**			
4.00						

Table 1 : Recommended installation depth for PVC pipes. Eshort=3,600N/mm - Elong=1,750 N/mm

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Indicative height **H**_laying in m	**PP-HM** PIPES Loads **OUTSIDE** traffic areas Load model 1 SIA 160 **U1/V1** profile				**PP-HM** PIPES Loads **INSIDE** traffic areas Load model 3 SIA 160 **U1/V1** profile			
	SDR 33 (S 16) **SN 4**	SDR 29 (S 14) **SN 8-10**	SDR 26 (S 12.5) **SN 12**	SDR 22 (S 10.5) **SN 16**	SDR 33 (S 16) **SN 4**	SDR 29 (S 14) **SN 8-10**	SDR 26 (S 12.5) **SN 12**	SDR 22 (S 10.5) **SN 16**
0.50				**0.55**				**0.58**
0.60		**0.68**	**0.62**				**0.64**	
0.70	**0.72**					**0.72**		
0.80					**0.78**			
0.90								
1.00								
.								
.								
.								
2.80								
2.90								
3.00								
3.10					**3.05**			
3.20								
3.30						**3.25**		
3.40	**3.40**							
3.50		**3.55**					**3.48**	
3.60								
3.70								
3.80			**3.80**					
3.90								**3.97**
4.00								
4.10								
4.20				**4.20**				

Table 2: Recommended installation depth for PP-HM pipes. Eshort=1'900N/mm - Elong=700 N/mm

Indicative height **H**_laying in m	**PE-HD** PIPES Loads **OUTSIDE** traffic areas Load model 1 SIA 160 **U1/V1** profile			**PE-HD** PIPES Loads **INSIDE** traffic areas Load model 3 SIA 160 **U1/V1** profile		
	SDR 33 (S 16) **SN 2**	SDR 26 (S 12.5) **SN 4**	SDR 21 (S 10) **SN 8**	SDR 33 (S 16) **SN 2**	SDR 26 (S 12.5) **SN 4**	SDR 21 (S 10) **SN 8**
0.50						
0.60			**0.60**			
0.70						**0.65**
0.80		**0.78**				
0.90					**0.88**	
1.00						
1.10	**1.10**					
1.20						
1.30						
1.40						
1.50						
1.60				**1.55**		
1.70						
1.80						
1.90				**1.90**		
.						
.						
2.80	**2.75**					
2.90					**2.90**	
3.00						
3.10						
3.20						**3.20**
3.30		**3.30**				
3.40						
3.50			**3.50**			
3.60						

Table 3: Recommended laying depth for HDPE pipes. Eshort = 1000 N / mm; Elong = 150 N / mm

Recycling plastic material

For more than 50 years, Canplast has been sorting and recycling the plastic material it uses to manufacture plastic pipe networks. Here are, listed below, the different phases of recycling.

Figure 1 : The PVC waste is sorted by material and colour. The pipes and plates are cut into pieces.

Figure 2 : The conveyor belt feeds the crusher.

Figure 3 : The PVC waste is crushed by the metal knives of the crusher.

Figure 4 : A fan propels the crushed material into bags.

Figure 5 : The bags are stored and transported to the pipe manufacturing plant. A final treatment of the recycled material will be done in the plant before mixing with raw material.

Figure 6 : The above operations are also valid for polyethylene (PE) and polypropylene (PP).

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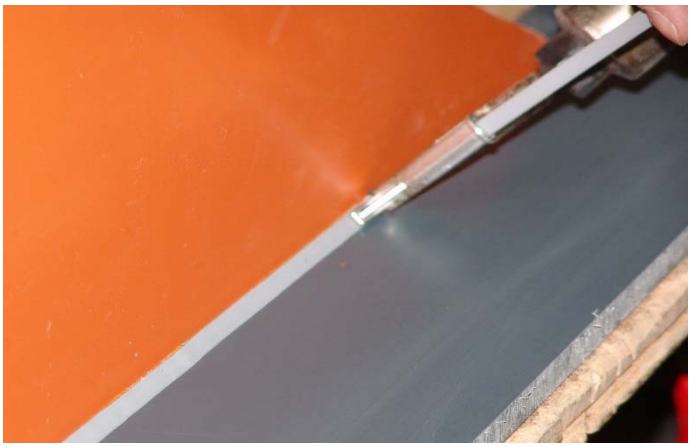
PVC welding

Canplast has been manufacturing custom-made PVC parts since 1967.

1. Tack welding is a necessary operation in order to obtain a good weld. This hot assembly operation, with no required additional material, makes it possible to plug the spaces between the elements and fix them slightly before welding them.

2. The welding is carried out with a suitable nozzle.The filler material is a triangular rod. The air at over 300°C produced by the device simultaneously heats the underside of the rod and the upper face of the support.



3. The pressure exerted on the rod and the welding nozzle is sufficient to obtain excellent adhesion of the welding nozzle. The orange or grey colour of the PVC does not disrupt the weld because it is the same material, simply with a different dye.

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PE welding with Haering© extruder

1. The raw material is in the form of granulated PE (polyethylene) which is used to fill the silo placed on the extruder.

2. The welder heats the tack welded elements with a blow-dryer. His experience allows him to test the temperature of the support by pressing a metal point on the material which softens through heating.

3. The extruder heats the filler material to a temperature of approximately 220°C and propels it into a sausage shape through a nozzle of variable diameter. The welder carries this weld bead inside a Teflon pipe and applies it unto the support.

4. For all types of plastic welds, it is important that the temperature of the support and the filler material are the same and that the contact pressure is maintained. For this, we crush the weld with a Teflon spatula.

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PE and PP welding with a gun-extruder

1. This gun-extruder is used for welding PE (polyethylene) and PP (polypropylene). It is fed with raw material through a wire of 4 or 5 mm in diameter. The material, heated between 200 and 220°C, is propelled through the apparatus by a worm drive.

   A similar device is especially designed for PVC welding.

2. Tack welding, described in 'PVC welding', is necessary for both PE and PP as well as for PVC. For PE and PP, surface scraping is required before welding.

   The elements to be welded are heated by a hot air nozzle located at the front of the tip of the gun. The Teflon shoe located at the rear of the gun tip is shaped according to the shape and size of the desired weld bead.

3. Welding of a PE chamber base with a gun-extruder. For welding in confined spaces, refer to « PE welding with Haering© extruder »

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