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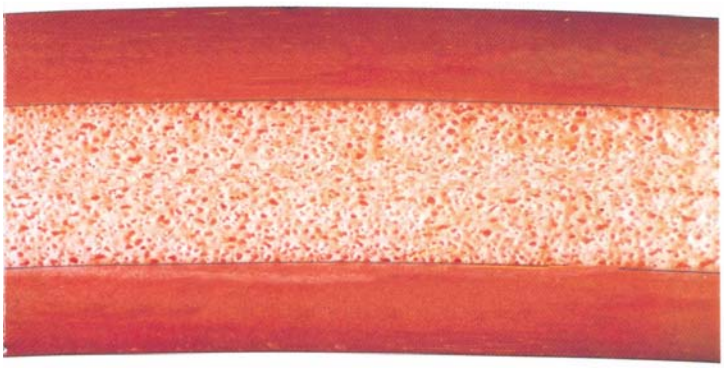
STRUCTURED WALL U-PVC SEWER PIPES

General description

Plassim's structured wall sewer pipes are produced from PVC in three layers. The outer and inner layers give the appearance of a solid wall PVC pipe but the middle layer is in fact foamed PVC.

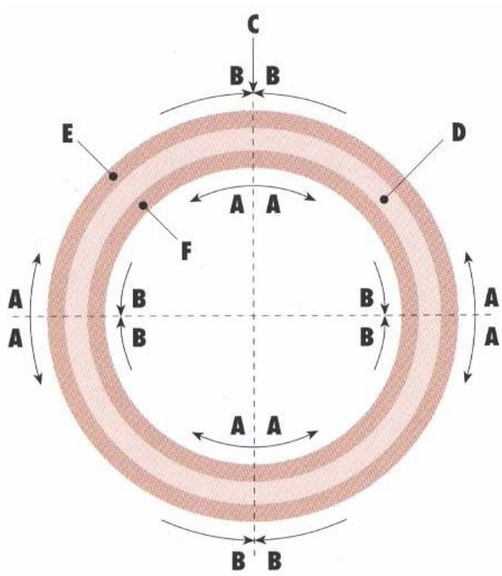
The idea that prompted the engineers who developed the pipe was to reproduce a known phenomenon in nature (in trees for example) whereby the inner core of an object has a porous structure, providing high mechanical strength on the one hand but, on the other, reducing weight.



Cross section of U-PVC Structured Wall Pipe

Detail of the stresses at work on the cross section.

- A – tensile stress
- B – compressive stress
- C – external load
- D – Internal foamed PVC core
- E – outer PVC layer
- F – inner PVC layer



Pipe Secification

The pipes are produced according to Israeli Standard 21138-2 (ISO21138-2) and are licensed by the Israeli Standards Institution to mark the Israeli Standards Mark

They are produced according to the following specification:

- Color: Orange (RAL 8023)
- Ring stiffness: 4000 N/m² (SN4) or 8000 N/m² (SN8)
- Connections: The pipes have integral bell sockets and are connected by means of socket and spigot joints with standard elastomeric seals.
- Lengths: The pipes are produced in lengths from 3m to 6m.
- Dimensions:

NOMINAL OUTSIDE DIAMETER (mm)	WALL THICKNESS (mm)	
	SN4	SN8
110	3.0	3.4
160	3.8	4.9
200	5.1	6.2
250	6.3	7.7
315	7.9	9.7
355	8.7	10.9
400	9.8	12.3
450	11.0	13.8
500	12.3	15.3

Material

The pipes are produced from Unplasticized Polyvinyl Chloride with the following characterisics:

Specific Gravity:	1.4 g/cm^3
Tensile Strength:	50-60 N/mm^2
Modulus Of Elasticity 20 ºC :	3000 N/mm^2
Thermal Conductivity:	0.15 Watt/m ºC
Specific heat:	0.23 Kcal/Kg ºC
Coefficient Of Linear Expansion:	0.08 mm/m ºC
Water Absorption:	< 4 mg/cm^3

Pipe Characteristics

- Resistance to external load (buckling)

Pipes are produced according to two standard ring stiffnesses, 4 kN/m^2 and 8 kN/m^2. These are the same values found in conventional PVC solid wall sewer pipe which allows the design engineer to choose the pipe best suited for his purpose in the same way as he would when using a solid wall pipe.

Under normal conditions, for depths between 0.8m and 6m, pipes with a ring stiffness of 4 kN/m^2 will suffice. Where there is poor soil compaction or for unusual loads pipes with a ring stiffness 8 kN/m^2 may be used.

- Impact resistance

Due to the fact that the pipes have a solid cross section (albeit with a foamed core) their resistance to impact is similar to solid wall pipes.

- Hydrostatic pressure resistance

Gravity sewer pipes are intended for pressures up to 0.5 bar but occasionally higher pressures may be experienced due to blockages in pipes or manholes. Plassim's structured wall pipes can withstand pressures of up to 4 bar. However this should not be used as a design characteristic but rather as a safety factor.

- Abrasion resistance

The pipes are resistant to abrasion and, according to tests performed at the Darmstadt Laboratories with a slurry of gravel, the pipes perform better than steel or cement.

- Corrosion resistance

PVC is resistant to most chemicals found in normal sewage including hydrogen sulphide, fertilizers etc. Plassim's engineers should be consulted before using pipes for special industrial waste or for waste at high temperatures.

- Hydraulic flow

The surface of PVC pipe is especially smooth allowing the design engineer to calculate the flow of liquids using coefficients C = 150 or N = 0.009.

Manning's coefficient of roughness: 0.009

Hazen Williams coefficient of smoothness: 150

- Accessories

All regular PVC sewage fittings are suitable for use with structured wall pipes.

Installation

Installation should be carried out according to relevant National standards

e.g : ASTM D2321 Practice for installation of thermoplastic pipe for sewers and other gravity flow applications.