SEIF

FACTORIES

- 10th of Ramadan, block 13 South A6
- Tel. : **02 333 70 886**
- Fax : **02 333 70 889**
- Borg Al Arab, 4th zone
- Tel. : **03 3925200** mob. : **01202227943 / 01288881573**
- Fax : **033937581**

المصانع:

- العاشر من رمضان، بلوك ١٣ جنوب أ٦
- تيليفون : **٠٢ ٣٣٣ ٧٠ ٨٨٦**
- فاكس : **٠٢ ٣٣٣ ٧٠ ٨٨٩**
- برج العرب، المنطقة الرابعة
- تيليفون : **٠٣ ٣٩٢٥٢٠٠**
- فاكس : **٠٣٣٩٣٧٥٨١**
- موبايل : **٠١٢٨٨٨٨١٥٧٣ / ٠١٢٠٢٢٢٧٩٤٣**

- Email : **sales@seifalnasr.com**

www.seif-pipes.com

WATER TECHNOLOGY

Corrugated HDPE PIPES

WATER
TECHNOLOGY

Corrugated HDPE PIPES

Seif Al Nasr company believes that every drop count. So, the most precious liquid on earth can be transported without wasting a single drop of water.

Technical Guide

STD [DIN16961/EN13476]
Specifications for Polyethylene (PE) pipes with profiled or double wall pipes with outside corrugated and inside smooth surface

Raw Material Partners

Borouge
سابك sabic
TASNEE التصنيع

Raw Material High Modulus of Elasticity PE

Polyethylene is thermoplastics with excellent properties for the application of water and sewer, as well as for the fabrication of containers for liquids and solid materials.

Physical a Mechanical Properties of Material

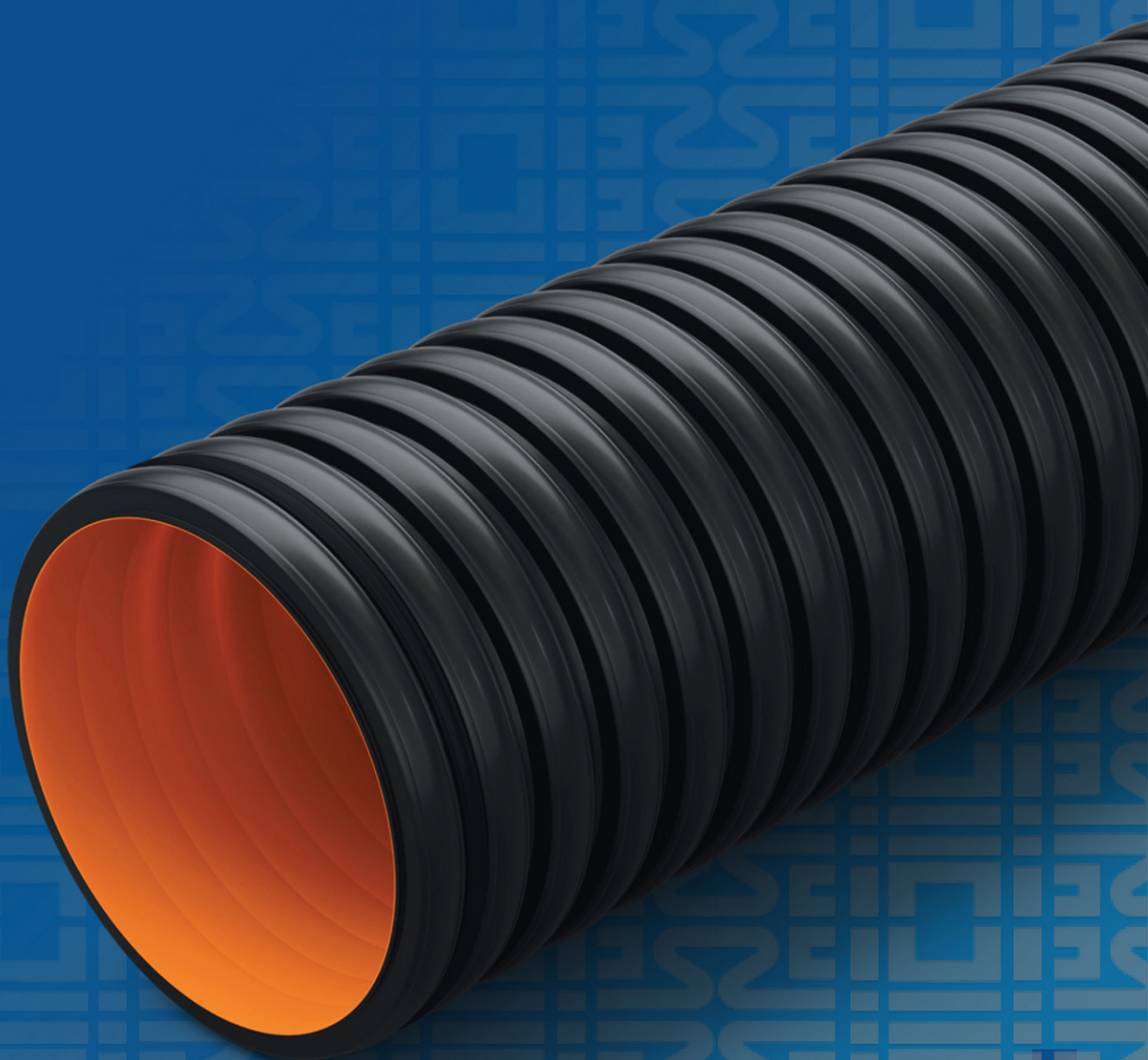
Properties	T.Value
Density	0.960kg/m³
Modulus Of Elasticity	1100 mpa
Elongation	>600 %
Thermal stability - Oxidation induction	>20 min
Color	Black/Orange

SEIF AL NASR COMPANY PROFILE

FOR PLASTIC PIPES

SEIF AL NASR is recognized as one of the leading manufacturers in Egypt's plastic pipe industry. Established in 2004 in Borg El Arab, the company was founded to meet the growing demand for high-quality plastic products in both local and regional markets. Its latest manufacturing facility, located in 10th of Ramadan City, is equipped with state-of- the-art machinery and advanced production technologies, with an annual production capacity of 240,000 tons of plastic materials.

SEIF AL NASR provides a comprehensive range of corrugated products, including pipes, fittings, manholes, and chambers, with internal diameters ranging from 100 mm up to 2500 mm. The company also offers various ring stiffness classes designed to suit different soil conditions, installation depths, excavation widths, and groundwater levels. Ring stiffness specifications are either provided by project consultants or carefully designed by SEIF AL NASR's engineering team to ensure optimal performance and reliability.



الهيئة القومية لمياه الشرب والصرف الصحي
إدارة الاختبارات والرقابة على الصناعة

وزارة الإسكان والمرافق والمجتمعات العمرانية
Ministry of Housing, Utilities & Urban Communities

شهادة اعتماد منشأة إنتاجية

(مواسير وقطع بولي ايثيلين-مواسير UPVC)

اسم الشركة : شركة سيف النصر حسام ابراهيم فتح الله سيف النصر وشركاه .

عنوان الإدارة : ١٥ أ شارع جابر ابن حيان الدور الثاني شقه ٦ الدقي الجيزة .

عنوان المصنع : القطعة رقم١٣ المنطقة الصناعية جنوب أ ٦ اكتوبر العاشر من رمضان - الشرقية .

السجل التجاري: ٥٣٦٥٥ مكتب سجل تجاري : غرفه الاسكندرية محافظة : الاسكندرية .

ب-ض رقم تسجيل ضريبي : ٥٦٩-٧٥٧-٦٦٥ مأمورية: كبار ومتوسطى الممولين محافظة : الاسكندرية .

سجل صناعي رقم : ٠٩٢١١٠١١٠١٠١٨٢٦٣ سنة الإصدار : ٢٠٢١ نوعية الصناعة : كيماوية .

رخصة :(دائمة) رقم : ٩٢١١٠١١٠٢٠١٦١٤ (مدينة): العاشر من رمضان محافظة الشرقية .

المنتجات المعتمدة لدى الهيئة : -

١. مواسير بولي ايثيلين عالي الكثافة حتى قطر ١٦٠٠مم بضغوط مختلفة .
٢. قطع بولي ايثيلين عالي الكثافة حتى قطر ١٢٠٠مم بضغوط مختلفة .
٣. مواسير وقطع بولى ايثيلين معرج CHDPE من قطر ١٠٠مم حتى قطر ٢٥٠٠مم بجساءات مختلفة .
٤. مواسير بلاستيك UPVC حتي قطر ٨٠٠مم بضغوط مختلفة .
٥. منهولات وغرف تفتيش من قطر ٣٠٠مم حتى قطر ٢٥٠٠مم .

للاستخدام فى مشروعات مياه الشرب والصرف الصحى .

- طبقا للمواصفات القياسية المصرية و العالمية المتبعة فى هذا الشأن .
- يتم الالتزام بتعليمات الادارة و الموضحة خلفة وفي حاله مخالفتها يعتبر لاغي .
- شهادة الاعتماد لا تستخدم كبديل لشهادات اختبار الهيئة التى تصدر لكل امر توريد على حده .

المدير العام

مهندسة /

" سمية محمد محمد نعله"

صادر في ١٦/٤/٢٠٢٦

ساري حتى ١/٣/٢٠٢٦م

(تاريخ الاعتماد السارى)

Certificate of Registration

This is to Certify that the Environmental Management System of

SEIF ALNASR CO.
(HOSSAM IBRAHIM FATHALLAH SEIF ALNASR & HIS PARTNERS)
-WATER TECHNOLOGY PIPE CO.

HEAD OFFICE: 77 IBN BATTUTA ST., ALLABAN - ALEXANDRIA- EGYPT

BRANCHES: PLOT NO (1-22), BLOCK 34, 4TH INDUSTRIAL ZONE, NEW BORG EL ARAB CITY- ALEXANDRIA- EGYPT

PLOT NO. 13 - SOUTH OF INDUSTRIAL ZONE 6A - TENTH OF RAMADAN CITY - SHARKIA - EGYPT

Has been assessed and found to conform to the requirement of

ISO 14001:2015

This certificate is valid for the following scope

PRODUCTION OF PVC & HDPE PIPES

Certificate No.: 210105022001

Initial Registration Date:05.01.2021 **Issuance Date:05.01.2024**

Date of Expiry* **:04.01.2027**

2nd Surveillance Due :05.12.2025

Director:

EGAC Accredited
EMS Certification
CAB # 011914

Al-Noor For Certification , Training & Import
Ph& Fax:+20663262324, Mob: +201228163670 , +201004884221
email:info@noor-eg.com website:www.noor-eg.com
Building No. 34, 2nd Floor, Elshahid Tayar Mostafa Mohamed Yousef Noman Street - Port Said - Egypt

Certificate of Registration

This is to Certify that the Quality Management System of

SEIF ALNASR CO.
(HOSSAM IBRAHIM FATHALLAH SEIF ALNASR & HIS PARTNERS)
-WATER TECHNOLOGY PIPE CO.

HEAD OFFICE: 77 IBN BATTUTA ST., ALLABAN - ALEXANDRIA- EGYPT

BRANCHES: PLOT NO (1-22), BLOCK 34, 4TH INDUSTRIAL ZONE, NEW BORG EL ARAB CITY- ALEXANDRIA- EGYPT

PLOT NO. 13 - SOUTH OF INDUSTRIAL ZONE 6A - TENTH OF RAMADAN CITY - SHARKIA - EGYPT

Has been assessed and found to conform to the requirement of

ISO 9001:2015

This certificate is valid for the following scope

PRODUCTION OF PVC & HDPE PIPES

Certificate No.: 210105012001

Initial Registration Date:05.01.2021 **Issuance Date:05.01.2024**

Date of Expiry* **:04.01.2027**

2nd Surveillance Due :05.12.2025

Director:

EGAC Accredited
QMS Certification
CAB # 011914

Al-Noor For Certification , Training & Import
Ph& Fax:+20663262324, Mob: +201228163670 , +201004884221
email:info@noor-eg.com website:www.noor-eg.com
Building No. 34, 2nd Floor, Elshahid Tayar Mostafa Mohamed Yousef Noman Street - Port Said - Egypt

Certificate of Registration

This is to Certify that the Occupational Health & Safety Management System of

SEIF ALNASR CO.
(HOSSAM IBRAHIM FATHALLAH SEIF ALNASR & HIS PARTNERS)
-WATER TECHNOLOGY PIPE CO.

HEAD OFFICE: 77 IBN BATTUTA ST., ALLABAN - ALEXANDRIA- EGYPT

BRANCHES: PLOT NO (1-22), BLOCK 34, 4TH INDUSTRIAL ZONE, NEW BORG EL ARAB CITY- ALEXANDRIA- EGYPT

PLOT NO. 13 - SOUTH OF INDUSTRIAL ZONE 6A - TENTH OF RAMADAN CITY - SHARKIA - EGYPT

Has been assessed and found to conform to the requirement of

ISO 45001:2018

This certificate is valid for the following scope

PRODUCTION OF PVC & HDPE PIPES

Certificate No.: 250105072002

Initial Registration Date:05.01.2025 **Issuance Date:05.01.2025**

Date of Expiry* **:04.01.2028**

1st Surveillance Due :05.12.2025 **2nd Surveillance Due :05.12.2026**

Director:

EGAC Accredited
OHSMS Certification
CAB # 011914

Al-Noor For Certification , Training & Import
Ph& Fax:+20663262324, Mob: +201228163670 , +201004884221
email:info@noor-eg.com website:www.noor-eg.com
Building No. 34, 2nd Floor, Elshahid Tayar Mostafa Mohamed Yousef Noman Street - Port Said - Egypt

BUREAU VERITAS

Certification

Awarded to

SEIF ELNASR CO."WATER TECHNOLOGY PIPE"

Head Office & Operative Site
10th of Ramadan, south A6

Bureau Veritas Egypt.- Industry Division certify that the following products:

Polyethylene pipes (PE)

Designation/Compound code	Color pipe/strips	SDR	from DN	to DN
PE 100/R01	black/orange (Note A)	11, 17, 17.6	32	355
PE 100/T11	Orange/-	11, 17, 17.6	32	355
PE 80/R06	Yellow/-	11, 17, 17.6	32	355

Note A: the strips are made by co-extrudeed process (code compound R07)

Commercial Brand:
SEIF

Code compound(1):
R01(BorSafe HE3490-LS) T11(Tasnee 100 Orange) R04(BorSafe HE3490-LSH) R06(BorSafe ME3441)
R07(BorSafe HE3492-LSH)

(1)For raw materials details please check www.traccoding.com

Have been audited and found to be in accordance with the requirements of the:

EN 1555-2:2021
Plastics piping systems for the supply of gaseous fuels
Polyethylene (PE) – Part 2: Pipes

Certification issued in conformity to Bureau Veritas Procedure P-21 and CEN /TS 1555-7:2021 scheme Type 3

Original Issuances Date: 26-11-2024
Current Issuances date: 15-07-2025
Expiration date: 25-11-2026

The validity of this certificate is subject to a constant periodical surveillance, and it can be checked on the following website: www.bureauveritas-eg.com . Further clarifications regarding the scope of this certificate and the applicability of standard's requirements may be obtained by consulting the organisation.

Massimo Ianni
Technical Auditor

Ashraf Aly
Industry BL Manager

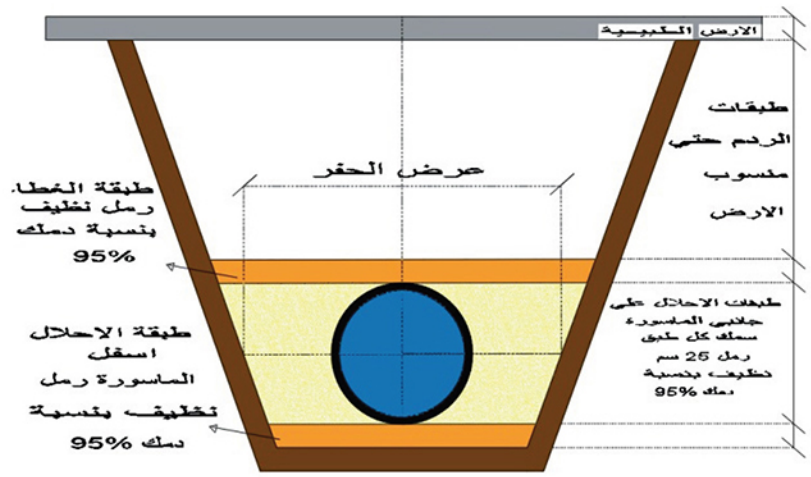
Certificate No.: 023/001

All tests done in Italian accredited laboratories by "ACCREDIA

Bureau veritas – Industry Divison Egypt
57, Hassan Aflaton Street, El Golf Nasr City Cairo, Egypt

About Corrugated Pipes
are affected by the following:

- trench width
- trench depth degree of compaction ofthe embedment
- degree of compaction of the main backfill
- pipe support andtrench bottomconditions
- construction traffic and temporary loads
- soil type & parameters (eg. subsoil , trench walls, backfill)
- ground & soil conditions (eg. frost and thaw, rain, snow,
- flooding) ground water table
- additional pipelines in the same trench

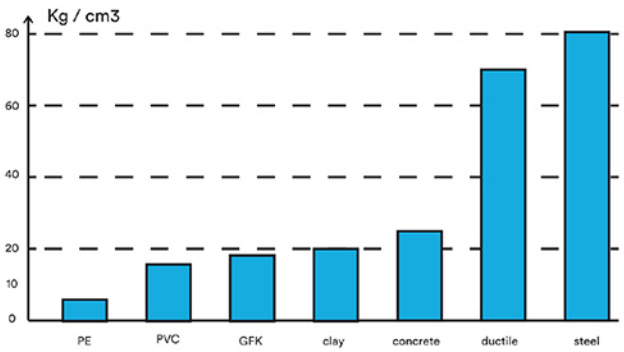


SEIF corrugated pipes Applications:

- Underground drainage and sewer application
- Disposal of industrial effluents Stormwater
- drainage Rainwater harvesting and
- ground water recharge Road/highway cross
- drainage cable piping ducts

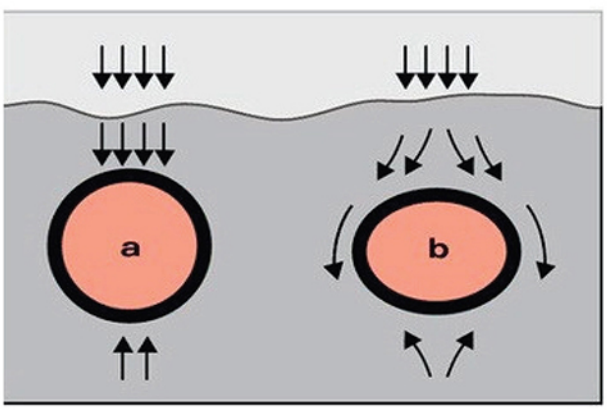
SEIF corrugated pipes Advantages:

- Anti-corrosion
- resistant to chemical attack
- resistant to micro organisms UV Resistance
- high flexible and impact strength
- fully leak tight and water tight
- smooth inner surface
- resistant to degradation bu uv rays
- useful life time over years
- deformation resistance
- ECO friendly
- long life pipe
- Cost effective - 60 to 70% weight saving in comparison to solid wall plastic pipes and 95% lighter than concrete pipes makes these pipes much cost effective
- Excellent Stiffness
- Easy transportation (very light) & quick installation



Structural Behaviour of Flexible Pipes in Soil

When a flexible pipe, such as an HDPE profiled pipe, is subjected to vertical soil loads, it undergoes slight deflection. This deformation generates horizontal soil pressure that acts as a support. When the vertical and horizontal pressures are nearly equal, the load distribution around the pipe resembles a hydrostatic condition. In this state, the pipe wall is mainly subjected to circumferential (hoop) compressive stresses.
With increased burial depth, there is a higher risk of buckling. However, as the pipe deflects under vertical load, it mobilizes passive soil resistance along its sides. This interaction results in a ring deflection that significantly reduces the vertical load on the pipe itself. Instead, the load is transferred to the surrounding soil, which forms a natural arching effect over the pipe. In essence, when a flexible pipe like HDPE is buried, the pipe and the surrounding soil form a composite structure, working together to distribute loads and maintain system integrity.



Seif Al Nasr HDPE Profiled/Spiral pipes

SeifAl Nasr's HDPEspiralstructuredwallpipes are manufactured using a high-density polyethylene material through a spiralwinding process. Known for their strength and efficiency, these pipes offer a cost-effective solution by achieving high ring stiffness with reduced raw material usage—outperforming traditional solid wall HDPE pipes of the same stiffness class.

Available in inner diameters up to 4000 mm, the pipes are produced in various ring stiffness grades, reaching up to 64 KN/m². Each pipe features an integrated socket and spigot for secure and easy jointing, and is supplied in lengths of up to 6 meters.

Standard pipe colour includes a black exterior with an orange inner layer, though custom colour options are available upon request to meet specific project requirements.

Spiral pipes are engineered with a dual-layer construction, featuring a smooth inner layer and an external spiral-wound corrugated wall. These pipes are manufactured by continuously extruding and welding a high-density polyethylene (HDPE) inner layer, while the profiled outer layer—reinforced with HDPE-coated high-strength ribs—is spirally wound over it. The ribbed outer profile enhances the pipe's structural integrity, allowing it to withstand heavy loads. Various profile shapes and stiffness grades are available to suit specific site conditions and design requirements. One of the key advantages of this innovative design is its lightweight nature, without compromising strength. Compared to solid wall pipes, Spiral pipes use significantly less material while maintaining equivalent mechanical performance—offering up to 60–70% weight reduction compared to solid wall plastic pipes, and up to 95% compared to concrete pipes. This results in considerable cost savings in both material and transportation, making Spiral pipes a highly efficient and economical solution.

Used Standards:

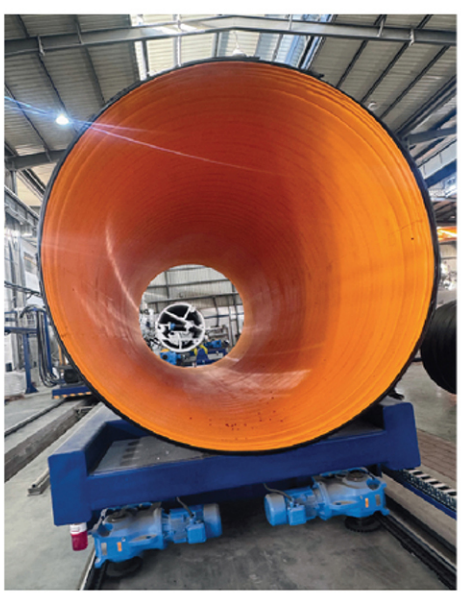
Subject	**Standards** EN 13476, ISO21138, DIN 16961, ASTM
Pipes	F 894 ATV A 127 EN 1610, ASTM D2321, ASTM
Static calculations	D2774, ASTM F 1668 DVS 2207, DIN 16961, ASTM
Pipes installations	D 2657, ASTM F 1055 ASTM D3212, EN 13476
Pipes welding	16961 DIN
Rubber joints of pipes	EN 1277

Tightness test:

Whenunder0.5bar 15 min conditions according to joins welded with electro-fusion methodaccordingto TS 12132standard. No leakage shall occur at the end of period.

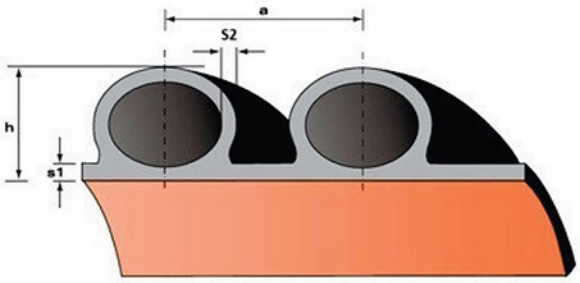
Ring rigidity calculations

All structuralcalculations forSEIF profiled pipes are carried out based on the specific project conditions and in compliance with relevant DIN and ATV standards. The ring stiffness and external load resistance of SEIF spiral pipes are evaluated in accordance with ATV A 127, while product testing is conducted following DIN 16961 guidelines.
As a standard practice, durability calculations are performed with a safety factor of 2, ensuring the reliability and long-term performance of the pipe under operational conditions.



Types of profiled pipes

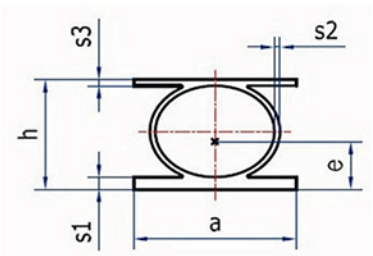
OPW (Open profile wall)



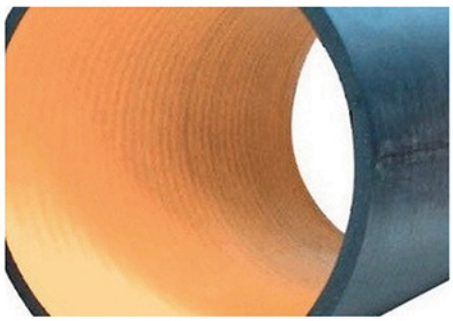
a = profile distance [mm]
s1 = waterway thickness [mm]
s2 = coating thickness [mm]
h = profile height [mm]

CPW (close profile wall)

Thistype of profile pipefeatures a smooth interior and exterior surface, incorporating one or more internal profile layers. Its advanced structure provides exceptionally high long-term stiffness, making it an ideal solution for applications involving extremely high loads and large diameters.

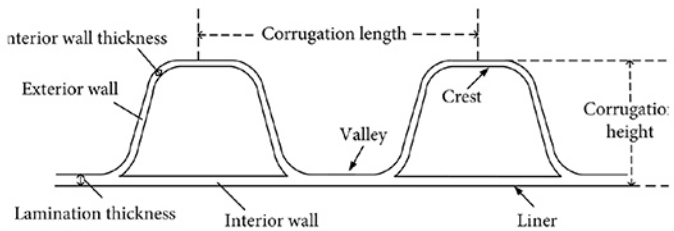


SW (Solid wall pipe)



The SW type is a homogeneous, solid-wall pipe with smooth inner and outer surfaces. These pipes are suitable for applications involving internal working pressure. Wall thicknesses range from a minimum of 5 mm up to a maximum of 80 mm, allowing for use in a wide variety of pressure and structural requirements.

Double wall



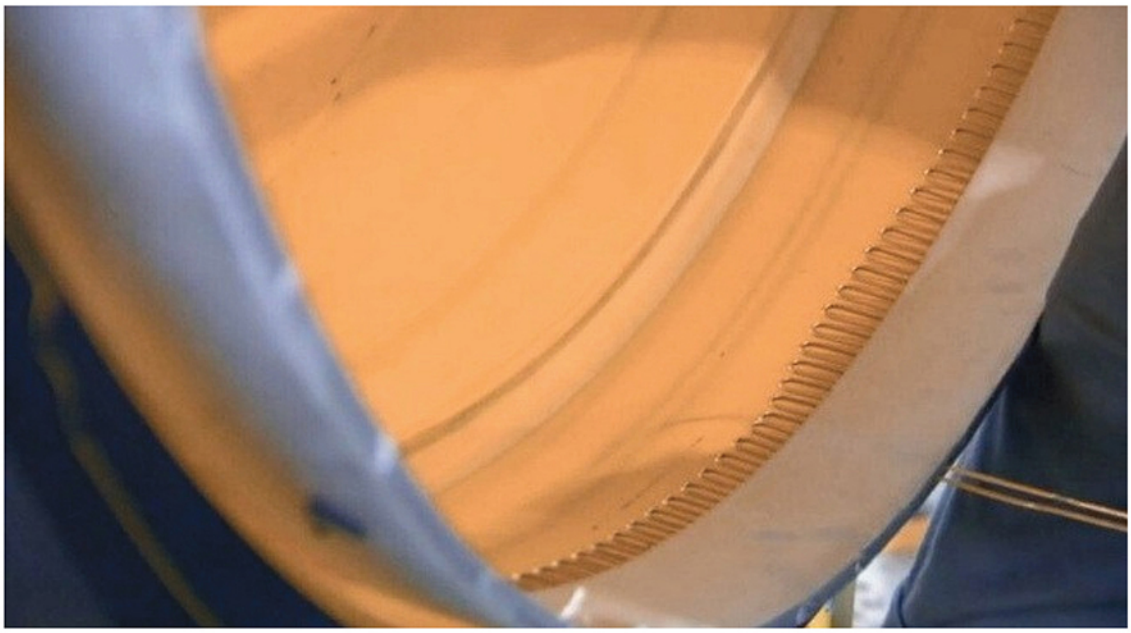
Profiled pipes Jointing method

1) Rubber ring placed on the spigot end

Our system features a solid, plain socket and spigot connection. The minimum wall thickness of the spigot complies with the requirements outlined in EN 13476-3, Table 7. Additionally, the combined ring stiffness of the socket and spigot exceeds the ring stiffness of the main pipe, ensuring enhanced structural integrity and reliable joint performance.

Remark : on special request pipes can be supplied with other jointing techniques like extrusion welding, flange connection and butt welding

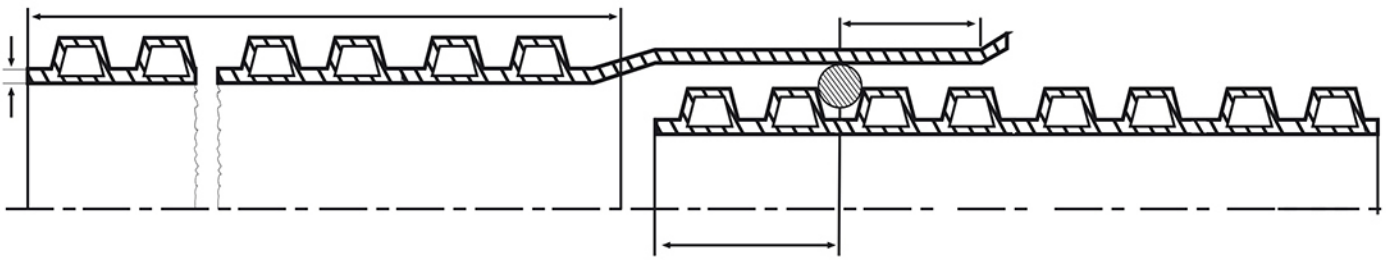
2) Electro-fusion Socket



This jointing method is highly preferred, as it creates a fully homogeneous and leak-proof pipeline system. A heating wire embedded within the socket or spigot is activated using a specialized electrofusion welding device, securely bonding the two pipe ends together.

The electrofusion technique offers a reliable, efficient, and straightforward installation process, making it especially suitable for use in confined spaces or narrow trenches. It ensures strong, durable joints while significantly reducing installation time.

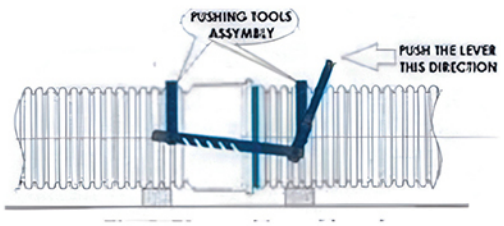
Jointing for DWC pipes



It is recommended that one always lay pipe starting at the down stream end, pushing spigots into the socket with the socket facing upstream. Always push spigot ends into the socket, not socket end into the spigot

1- Begin by inspecting the socket and remove any foreign matter. use a clean rag or brush to lubricate bell of pipe lubricant. Clean spigot end of the pipe
2- Remove protective wrap from gasket Using clean rag or brush, lubricate the exposed gasket with pipe lubricant. Do not allow lubricated section to touch dirt or backfill. Foreign matter could
3- allocate the rubber ring in the second valley, do put the rubber ring on the air line even if you are trying to make the pipe shorter.
4- adhere to the surface and compromise joint integrity. Place spigot into the socket and align.

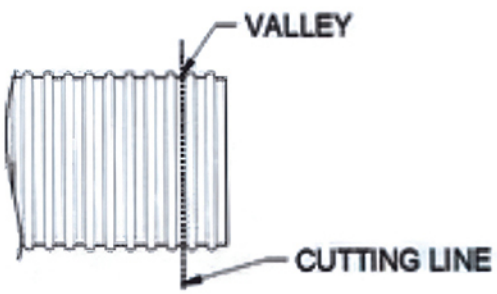
Bell end will be facing on the upstream end of the pipeline. Pushing the pipe will be done by either equipment or manually



I. CUTTING OF PIPE

When field cutting becomes necessary, cut the pipe to length before laying it in the trench.

- Utilize a hand, cable, or reciprocating saw.
- Always ensure that the cut is made in the valley between corrugations. Never cut through the pipe corrugations as this will compromise pipe integrity.
- Visually inspect the saw cut and remove any trim burrs to maintain joint integrity.



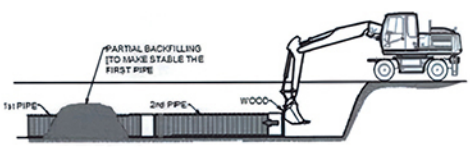
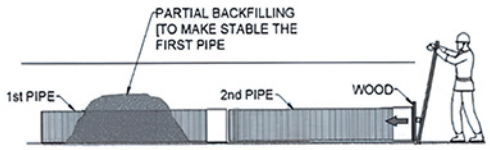


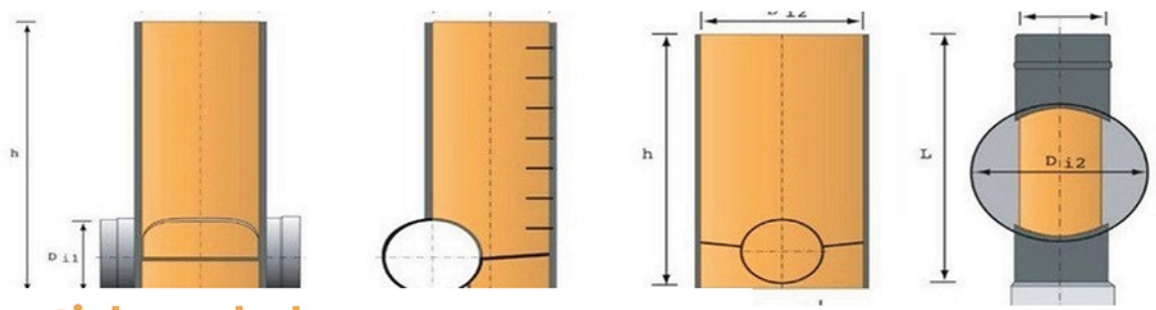
Fig. 18: Use equipment for greater 450mm



HDPE Manholes

Straight passage manholes

Manholes are essential components in sanitary sewer systems, serving key functions such as inspection, ventilation, flow control, and direction changes. Constructed entirely from high-density polyethylene (HDPE), they are supplied with appropriate top covers, with the option for concrete tops when required. To enable routine inspection and maintenance, manholes are strategically positioned at pipe bends, junctions, diameter transitions, and branch connections. Manufactured from the same HDPE material as the pipes, these manholes are joined to the system using compatible jointing methods. This ensures a fully integrated and homogeneous piping network with consistent material properties throughout.



Tangential manholes

The main advantages of the tangential manhole include its sustainable, flexible, lighweight inspection-friendly, self-cleaning , durable, and cost-effective construction

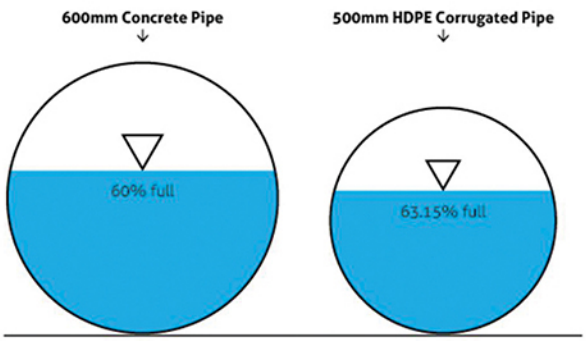
HDPE water valves chamber

water valves chambers are usedtocover water valves, those chambers are designed according to the excavation depth, chamber diameter, soil type and ground water level to determine the chamber ring stiffness needed.

Comparison between DWC -VS- Concrete Pipes

Parameters	HDPE Corrugated Pipes	Concrete pipes
chemical corrosion	High chemical and corrosion resistance.	Susceptible to damage from harsh chemicals and corrosion.
Material property	Flexible pipe	Rigid pipe
Weight	Very light	Heavy (19-20 times heavy than DWC pipes)
Roughness Coefficient of Pipes	0.009 Much higher flow rate due to less roughness coefficient	0.014 Lesser flow rate
Handling	Easy due to its lightweight	Difficult due to its heavy weight
Lifetime	More than 50 years	Around 15-20 years

PIPES DN 1.200	CAPACITY Q [l/sec.]	FULL capacity speed	V [m/sec.] HDPE Corrugated
DN = d.e. (d.i. = 1030 mm)	1350	77%	1,95
CONCRETE (d.i.)	1350	71%	1,57



Comparison Between DWC - Solid wall PIPES

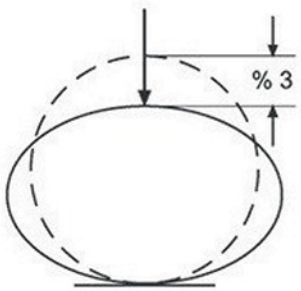
DWC -VS- Plastic Pipes

DWC-PIPES	Solid Wall – Plastic PIPES
D Light Duty It saves about 60- 70 % of the Material Based On Ring Stiffness Concept	Heavy Duty In Compared With DWC

Quality Assurance

Quality tests
RingFlexibility
Oxidation Induction
Time Test Impact Test
Melt Flow Index Test
Ring Stiffness Creep
Ratio Physical
Properties Water
Tightness TestEffecton
Heating

Testing (Ring stifness test) according to DIN 16961 & EN 1401



Technically, the pipe's ring stiffness is defined as:

SN = EI / Dm³

Where:

E –moduleofelasticity, in Pa

Dm –meanpipediameter, in m

I –momentofinertia,in m4/m

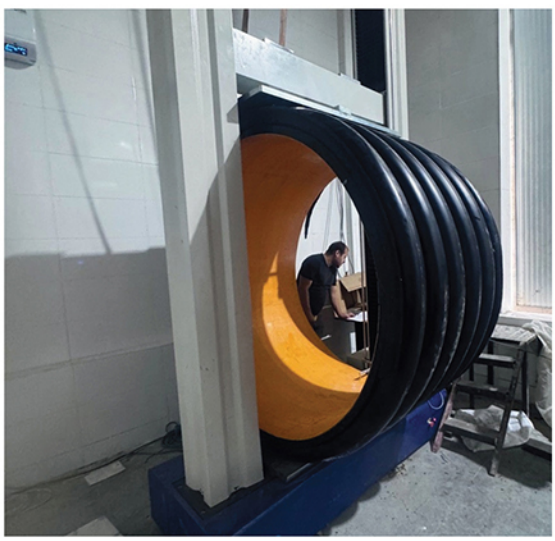
Calculation method according to ATV 127

$$S_{R24} = \frac{E_{C24} \cdot I}{r^3}$$

EC : Elasticity Modulus
I : Moment of Inertia
r : (DN/2) + neutral linear radius at e
(e: Distance of inertia of the pipe profile)

Minimum Elasticity Module Values (kN/m2)

Test time	HD-PE	PPH Homopolymer	PPR Copolymer
24 h Ec24	3.9 x 10^5	6.9 x 10^5	4.4 x 10^5



Standard pipe classes according to ISO9969 have ring stiffness of SN 4,8 and 12 KN/m2.

Testing With Air Method L

The testing times for pipelines excluding manholes and inspection chambers are given in table 3 in relation to pipe size and testing methods (LA; LB; LC; LD).

NOTE 1: An initial pressure approximately 10 % in excess of the required test pressure, Po , shall first be held for approximately 5 min. The pressure shall then be adjusted to the test pressure shown in table 3 related to testing method LA, LB, LC or LD. If the pressure drop measured after the testing time is less than Δ given in table 3 then the pipeline complies.

Table 2: Test pressure, pressure drop and testing times for testing with air

Testing Method	P_o kPa	ΔP kPa	Testing Time Min						
			DN100	DN200	DN300	DN400	DN600	DN800	DN1000
LA	10 (1)	25.5 0.25	5	5	7	10	14	19	24
LB	50 (5)	10 (1)	4	4	6	7	11	15	19
LC	100 (10)	15 (1.5)	3	3	4	5	8	11	14
LD	200 (20)	15 (1.5)	1.5	1.5	2	2.5	4	5	7
K_p-Values			0.058	0.058	0.04	0.03	0.02	0.015	0.012

$$t = \frac{1}{K_p} \times \frac{P_0}{P_0 - \Delta P}$$

$$K_p = \frac{12}{DN}$$

With t rounded to the nearest 0,5 minute when t ≤ 5 min, to the nearest minute when t > 5 min.

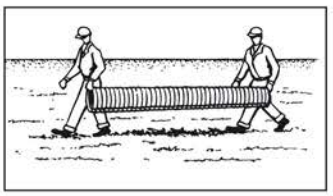
Storage:

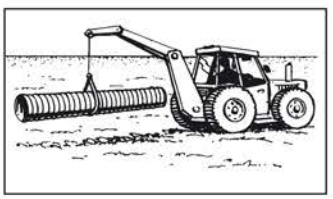
- Storage tn vertical rows with 3 meter high max
- The Storage floor must be flat
- Pipe socket free from any subjected load and stress

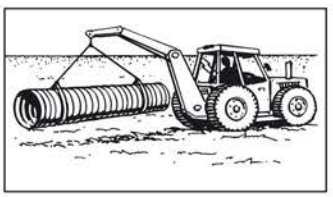
Handling:

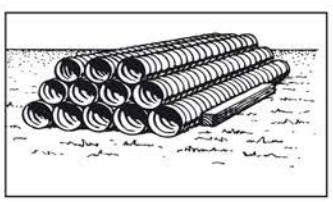
Directdriver to smooth, flat area, free from rocks or debris and any sharp things.

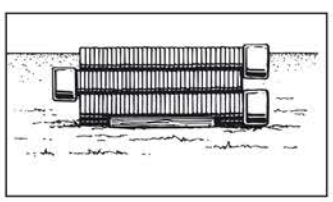
- Follow OSHA safety requirements.
- Don't drop the pipe.
- Pipes I.D 400 and smaller can be moved by hand. (see picture & table 3)
- Large pipe more than I.D 400 requires backhoe with nylon sling and to be lift from one point. (see picture & table 3)
- Large pipe I.D 800 and more must be lifting at two points with a nylon sling, space between two points around 3 meters. (see picture & table 3)
- Don't use loading boom or forklift directly on or inside pipe.
- Storage area must be protected from sunrays.

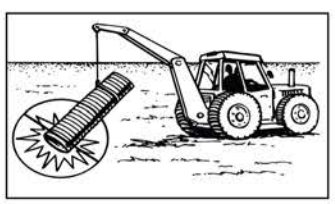












I.D (MM)	Handling Method
100	Labor
125	Labor
150	Labor
200	Labor
250	Labor
300	Labor
400	Labor
500	Sling (One Point)
600	Sling (One Point)
800	Sling (Two Point)
1000	Sling (Two Point)
1200	Sling (Two Point)

Excavation Trench Preparing

- The trench must be prepared by having sand bedding layer at the bottom of the pipe.
- Reduces the loads above the pipes
- To prevent the pipe movement in the direction of the water flow so as not to be subjected to be broken, bending, deflated
- Pipes protection against any external broken as a result to the rocks and sharpy elements
-Under pipes Bedding thickness = 1/3 x OD (pipes)

Bedding heights above the pipes

Road Type	The minimum Depth m
Traffic	1.2
Side	0.9
Other destination	0.6
agriculture/Farms	0.45

The minimum Bedding Layer under the pipes must be 15 cm in case rocky soil at least 30 cm with sand layer

Excavation Width

Pipes ODMM	Theminimum Width Per Each Side
<315	30cm
≥ 315	according to the ATV calculations