30 Years experiances

Advanced Plastic Factory

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مصنع المتقدمة للبلاستيك

فخر الصناعة القطرية

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مصنع المتقدمة للبلاستيك

Advanced Plastic Factory

for plastic pipes u P.V.C , H.D.P.E and P.P.R pipes

- بزوغ فجر جديد فى عالم صناعة المواسير U.P.V.C- H.D.P.E.-M.D.P.E -P.P.R بتكنولوجيا حديثة وخبرة فنية عالية ودقه شديدة فى تحقيق المواصفات العالمية والقطرية بتقنيات حديثة ومتطورة وبطاقة إنتاجية تصل إلى ٢٠٠٠٠ عشرون ألف طن سنويا من ٢٠ مم وحتى قطر خارجى ١٢٠٠ مم لشبكات المياه بجميع الضغوط حتى ٢٥ بار وكذلك شبكات الصرف الصحى وشبكات الحريق والكابلات علاوة على المواسير المستخدمة فى شبكات التهوية ووصلات المنازل وذلك للمساهمة فى البنية التحتية والتنمية الحديثة لدولة قطر .

- تعتبر شبكات الصرف الصحى ومياه الشرب من العمليات الحيوية التى تؤثر فى إقتصاد البلاد وحياة الشعوب حيث تعتبر مواسير U.P.V.C-H.D.P.E.-M.D.P.E -P.P.R من أكثر المواسير أمنا لمياه الشرب والأنسب لشبكات الصرف الصحى ومعمرة لأكثر من خمسون عاما بشرط مطابقتها للمواصفات العالمية من حيث تركيب الخامات وعمليات الإنتاج

- شركة المتقدمة لصناعة المواسير البلاستيك تضمن للساده العملاء جودة الإنتاج ومطابقته للمواصفات العالمية بدقة لما تتميز به شركتنا من خبره فنية لأكثر من ثلاثين عاما فى مجال صناعة المواسير بالإضافة لما تمتلكه الشركة من ماكينات حديثة ذات تقنية عالية .

- تتميز الشركة بوجود مختبر مزود بأحدث الأجهزة المعملية التى تمثل مركز أبحاث يخدم المؤسسات الصناعية القطرية للوصول لتطبيق أعلى المواصفات.

- New down of the in industrial field of U P.V.C – H.D.P.E and P.P.R pipes with modernized technology and high experience moreover high accuracy for achieving QCS and international standards with production capacity 20000 tons per year of U P.V.C – H.D.P.E and P.P.R pipes from 20 mm up till 1200 mm outside diameter include all pressure, cables and sewerage networks.

Pressure and sewerage networks are one of biological processes that affect of the country's economy and people's lives.

- U P.V.C – H.D.P.E and P.P.R pipes are considered more safety for sewerage and drinking water network and have life time more than 50 years if they conforms to international standards of installation of raw materials and production processes as well as installation in a proper scientific methods .

- The Advanced plastic factory have team work more than 30 years experience so guarantees you the quality of production and production conformity to international standards by very carefully.

- The Advanced plastic factory offers the best services after sales operations.

- The Advanced plastic factory have central laboratory includes all modern laboratory instruments and consider search center serve Qatar industrial organization .

Introduction

Advanced factory for plastic pipes u P.V.C , H.D.P.E and P.P.R pipesl

We are pleased to extend our service in Qatar construction market with our new production facility Advanced Plastic Factory. The new unit is established to cover market needs from the pipes U P.V.C, P.P.R, M.D.P.E and H.D.P.E pipes that have good quality

The pipes are produced by highly trained and experienced team of workers and professional manpower under the supervision of highly qualified technical staff. The in-house testing facilities allow us to perform all kind of essential tests for close quality control on all type of products.

On the basis of our technical strength and professional approach so.

This is a technical handbook for the engineers who design and install water and sewage pipelines . It contains the most up-to-date information , based on worldwide know how and technical knowledge.

The period of pioneering the use of UPVC pipes for the distribution of water and sewerage is past And UPVC is widely established throughout the world because of its many advantages over other materials.

High quality pipes are manufactured within
EN ISO 9001:2008 certified quality management system

U.P.V.C materials specification and properties

The general properties given in the table below are those for PVC compound formulations used in pipe manufacture. It should be noted that these properties are relative to temperature and the duration of stress application .

Physical	Units	Value
Coefficient of linear expansion	K^{-1}	6×10^{-5}
Density	kg/m^3	1.4×10^3
Flammability (oxygenindex)	%	45
Softening point (Vicat - minimum)	°C	76
Friction Factors		
Manning		0.008 - 0.009
Hazen Williams		150
Nikuradse roughness (k)	mm	0.003 - 0.015

Polyvinylchloride P.V.C-u (un plasticized polyvinylchloride)

Polyvinylchloride is more commonly known by its abbreviated name PVC.

It is the oldest and most common plastic, being used in many branches of the industry as well as in daily life. Contrary to popular belief, this plastic that comes from the thermoplastic group is easily cement able, fusible, repeatedly reshapeable under heat, and highly recyclable. Scrap PVC may be recycled.

PVC is made by polymerizing vinylchloride, a gaslike monomer.

Advanced pipes for buried pipelines and for installations of drinking water systems are manufactured from PVCU (PVC unplasticized) without softener and without fillers.

For industrial applications.

Specification of advanced factory U.P.V.C pipes

	Properties at 20°C:	Units	Values	Method of Evaluation
Physical Properties	Specific Gravity at 23/23°C		1.43	ASTM D 792
	Flammability	Will not support Combustion		ASTM D 635
	Resistance to Burning	secretary	<30	BS 4607 Part 2:70
	Softening Point (VSP 5 Kgf)	°C	82	BS 2782: 1976
	Shore D Hardness		70	ASTM D 2240-75
	Thermal Conductivity 10/30°C	W/m·k	0.17	BS 874: 1973
	Co-efficient of Linear Expansion	°C⁻¹	6 x 10⁻⁵	ASTM D 696
	Specific Heat	cal/g°C	0.25	
Mechanical Properties	Impact Strength (Tree Falling)	kp/cm² cm/cm	No Break	SAS 14 1396 & BS 3506
	Modulus of Elasticity	kp/cm²	3 x 10⁵	DIN 53457
	Compressive Strength	kp/cm²	668	BS 4607 Part 2:70
	Resistance to Heat	(Impression Diameter)	<2	BS 4607 Part 2:70
Chemical Properties	Resistance to Water Absorption	mg/cm	<2.0	ISO 250 8/81 & DIN 8061
Electrical Properties	Volume Resistivity	ohm/cm	10¹⁴	DIN 53842
	Surface Resistance	ohm	10¹³	
	Power Factor at 10 Hertz		3	BS 4607 Part 2
	Dielectric Strength	V/mil	1400	BS 4607 Part 2
	Insulation Resistance	M.ohm	1.1 x 10⁷	

Advantage of U.P.V.C pipes

1-goood excellent resistance to acids and alkaline
2-good excellent to impact, broke and high loading
3-Easy to handling and transport
4-Light and low weight 4
5- Not effect in water waste, color and smell
6-It has long live time
7- Good flexibility and high resistance to impact, earthquakes and twisting
8-inside surface is very smooth so prevent any composite
9-high flow characterized
10- Resistance to high pressure and temperature
11- Resistance to weathering
12- Resistance to biological attach and growth
13- Resistance to abrasion
14- Water Hammer Resistance: reduced water hammer effects due to slower Surge celerity

Other advantage for u P.V.C pipes

-Drainage Installation (Industrial & Domestic)
-High strength to weight ratio
-Light weight, Easy to handle and install
-Smooth inner surface with lesser friction
-Easy to bend and cut
-Resistant to various alkalis, acids, other chemical and aggressive soils
-Variety of colors
-Fire Retardant properties
-Corrosion and abrasion resistant
-Insect and mouse proof
-Low thermal conductivity
-Shock Resistant
-Aging Resistant
-Pressure Resistant
-Innocuous
-Economical and Dependable
-Environmental Friendly

Applications of U.P.V.C

With excellent features U.P.V.C pipes have diversified applications and few of which are:

- Cold water plumbing services
- Drainage Installation (Industrial & Domestic)
- Mining
- Factory Supply Lines
- Chemical Plant Installations
- Electrical Conduits
- Irrigation and agriculture use
- Tube well casing and strainer
- Paper mill installation alum and pulp carrying
- Vent and ducting for power & communication cables

U P.V.C underground pipes (Gravity) for sewerage

DIN 19534
B.S 4660
B.S EN 1401
B.S 5481

U P . V . C p ressure pipes for cold water

DIN 8061/8062/2009
B.S 3505/3506
ISO 4422/19996
B.S EN 1452
ASTM D 1785
ASTM 2241
B.S 3505/3506
QCS 2014

U P.V.C pipe for electrical conduit and telephone duct

*B.S 6099
*NEMA TC-2
*Q-tel standard
*NEMA TC- 6
*NEMA TC- 8

U P.V.C above ground pipes for west soil, Vent and drainage

DIN 19531
ASTM D 2265
BS EN 5255
B.S 4514
B.S EN 1329
As/NEZ 1260

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Applications of U.P.V.C

1- According to QCS 2014 &DN 8061/8062

Class	Class 2		Class 3		Class 4		Class 5	
Pressure	4 BAR		6 BAR		10 BAR		16 BAR	
Nominal diameter	Wall thick.mm	Weight kg/m	Wall thick.mm	Weight kg/m	Wall thick.mm	Weight kg/m	Wall thick.mm	Weight kg/m
32	---	----	-----	-----	1.80	0.264	2.40	0.342
40	----	-----	1.8	0.334	1.9	0.350	3.00	0.525
50	----	-----	1.8	0.422	2.4	0.552	3.70	0.809
63	----	-----	1.9	0.562	3.00	0.854	4.70	1.290
75	1.8	0.642	2.2	0.782	3.60	1.22	5.60	1.820
90	1.8	0.774	2.7	1.13	4.30	1.75	6.70	2.61
110	2.2	1.16	3.20	1.64	5.30	2.61	8.20	3.90
125	2.5	1.48	3.70	2.13	6.00	3.34	9.30	5.01
140	2.8	1.84	4.10	2.65	6.70	4.18	10.40	6.27
160	3.2	2.41	4.70	3.44	7.70	5.47	11.90	8.17
180	3.6	3.02	5.30	4.37	8.70	6.88	13.40	10.40
200	4	3.70	5.90	5.37	9.60	8.510	14.90	12.80
225	4.5	4.70	6.60	6.76	10.80	10.80	16.70	16.10
250	4.9	5.65	7.30	8.31	11.90	13.20	18.60	19.90
280	5.5	7.11	8.20	10.4	13.40	16.60	20.80	24.90
315	6.2	9.02	9.20	13.2	15.00	20.90	23.40	31.50
355	7	11.4	10.40	16.7	16.90	26.50	26.30	39.90
400	7.9	14.5	11.70	21.1	19.10	33.70	29.70	50.80
450	8.9	18.3	12.3	26.8	21.5	42.7	----	----
500	9.8	22.4	14.6	34.38	23.9	52.6	----	----
560	11	28.1	16.4	41.4	26.7	65.8	----	---
630	12.4	35.7	18.4	54.6	30	83.2	-----	---

* Length – 6 meters
* Color – grey or dark grey
* socket – solvent or ring sell

2- According to B.S 3505

Nominal diameter	Outside diameter(mm)		Class C 9 bar		Class D 12 bar		Class E 15 bar	
	Mini.	Max.	Thick mm	Weight kg/m	Thick mm	Weight kg/m	Thick mm	Weight kg/m
1/2	21.2	21.5	-----	----	----	----	1.70	0.158
3/4	26.6	26.9	-----	-----	-----	-----	1.90	0.225
1	33.4	33.7	----	-----	-----	-----	2.20	0.350
1 1/4	42.1	42.4	----	-----	2.20	0.434	2.70	0.508
1 1/2	48.1	48.4	-----	-----	2.50	0.534	3.10	0.668
2	60.2	60.5	2.50	0.683	3.10	0.850	3.90	1.042
3	88.1	89.1	3.50	1.417	4.60	1.834	5.70	2.250
4	114.1	114.5	4.50	2.350	6.00	3.050	7.30	3.700
6	168.0	168.5	6.60	5.084	8.80	6.720	10.80	8.134
8	218.8	219.4	7.80	7.860	10.30	10.170	12.60	12.280
10	272.60	273.40	9.70	14.50	12.80	19.25	15.70	23.50
12	323.40	324.30	11.50	20.50	15.20	26.90	18.70	30.00

3- According to B.S EN 1452

Nominal diameter	SDR 41 S 20		SDR 34.4 S 16.7		SDR 33 S 16		SDR 26 S 12.5		SDR 21 S 10		SDR17 S 8		SDR 13.6 S 6.3	
	Pressure on service (design) coefficient C = 2.5													
	PN 6		PN 6		PN 8		PN 10		PN 12.5		PN 16		PN 20	
	Thick mm	Weight kg/m	Thick mm	Weight kg/m	Thick mm	Weight kg/m	Thick mm	Weight kg/m	Thick mm	Weight kg/m	Thick mm	Weight kg/m	Thick mm	Weight kg/m
50	1.5	0.36	1.6	0.38	2.00	0.469	2.4	0.56	3	0.68	3.70	0.82	4.60	0.995
63	1.9	0.58	2.00	0.59	2.5	0.739	3.00	0.866	3.8	1.08	4.70	1.31	5.80	1.57
75	2.2	0.78	2.3	0.82	2.9	1.01	3.6	1.24	4.5	1.52	5.60	1.85	6.80	2.19
90	2.7	1.13	2.8	1.17	3.5	1.46	4.3	1.77	5.4	2.18	6.70	2.64	8.20	3.17
	Pressure on service (design) coefficient C = 2													
	PN 6		PN 7.5		PN 8		PN 10		PN 12.5		PN 16		PN 20	
110	2.7	1.41	3.2	1.66	3.4	1.73	4.2	2.14	5.3	2.65	6.6	3.24	8.10	3.91
125	3.1	1.84	3.7	2.16	3.9	2.24	4.8	2.75	6.00	3.39	7.4	4.13	9.20	5.04
140	3.5	2.31	4.1	2.69	4.3	2.78	5.4	3.47	6.7	4.24	8.3	5.18	10.30	6.30
160	4.00	2.99	4.7	3.49	4.9	3.58	6.2	4.55	7.7	5.55	9.5	6.75	11.80	8.23
200	4.9	4.56	5.9	5.44	6.2	5.67	7.7	7.02	9.6	8.64	11.9	10.5	14.70	12.80
225	5.5	5.77	6.6	6.85	6.9	7.05	8.6	8.81	10.80	10.90	13.40	13.40	16.60	16.20
250	6.2	7.22	7.3	8.43	7.7	8.74	9.6	10.91	11.90	13.30	14.80	16.40	18.40	20.00
280	6.9	8.95	8.2	10.60	8.6	10.92	10.7	13.44	13.4	16.6	16.6	20.33	20.60	25.10
315	7.7	11.20	9.2	13.30	9.7	13.83	12.1	17.12	15.00	20.9	18.7	26.00	23.20	31.80
355	8.7	14.30	10.4	17.00	10.9	17.48	13.6	21.62	16.9	26.80	21.1	33.10	26.10	40.20
400	9.8	18.10	11.7	21.40	12.3	22.25	15.3	27.41	19.1	34.20	23.70	41.80	29.40	51.00
450	11.00	23.50	13.2	26.80	13.80	28.30	17.20	36.60	21.50	42.70	26.70	56.70	33.10	67.90
500	12.30	28.89	14.60	32.90	15.30	34.90	19.10	45.15	23.90	52.60	29.70	70.15	36.80	83.85
560	13.70	36.50	16.40	41.40	17.20	45.60	21.40	56.50	26.70	65.80	-----	-----	-----	-----
630	15.40	43.50	18.40	54.60	19.30	55.40	24.10	71.65	30.00	83.20	-----	-----	-----	-----

4 - According to ASTM D 2241

Nominal diameter inch	Outside diameter(mm)		SDR 32.5 8.6 BAR 125 psi		SDR 26 11 BAR 160 psi		SDR 21 13.8 BAR 200 psi	
	Mini.	Max.	Thick mm	Weight kg/m	Thick mm	Weight kg/m	Thick mm	Weight kg/m
1/2	21.2	21.50	-----	----	----	-----		
3/4	26.6	26.90	-----	-----	----	-----		
1	33.4	33.70	----	----	----	-----		
1 1/4	42.1	42.40	----	----	-----	----		-----
1 1/2	48.1	48.40	1.50	---	1.90	-----	2.30	0.520
2	60.2	60.50	1.90	0.558	2.30	0.657	2.90	0.804
3	88.1	89.10	2.70	1.130	3.40	1.390	4.20	1.680
4	114.1	114.50	3.50	1.850	4.40	2.280	5.40	2.790
6	168.0	168.50	5.20	3.990	6.50	4.970	8.00	6.060
8	218.8	219.40	6.70	6.720	8.40	8.350	10.40	10.20

- Color white
- Length 5.8 & 6 meter
- Socket plain
- solvent cement weld (SC/J) or rubber ring seal
- Application pressure pipe

5- According to ISO 4422/1996

Nominal diameter	SDR 33		SDR 26		SDR 21		SDR 17		SDR 13.6		SDR11	
	S 16		S 12.5		S 10		S 8		S 6.3		S 5	
	Pressure on service (design) coefficient C = 2											
	PN 6		PN 8		PN 10		PN 12.5		PN 16		PN 20	
	SDR 41		SDR 33		SDR 26		SDR 21		SDR 17		SDR 13.6	
	S 20		S 16		S 12.5		S 10		S 8		S 6.3	
	Th.mm	w.kg/m	Th.mm	w.kg/m	Th.mm	w.kg/m	Th.mm	w.kg/m	Th.mm	w.kg/m	Th.mm	w.kg/m
	2.7	1.41	3.4	1.73	4.2	2.17	5.3	2.16	6.6		8.1	3.90
110										3.24		
125	3.1	1.84	3.9	2.24	4.8	2.75	6.00	3.34	7.4	4.13	9.2	5.01
140	3.5	2.31	4.3	2.78	5.4	3.47	6.7	4.18	8.3	5.18	10.3	6.27
160	4.00	2.99	4.9	3.58	6.2	4.55	7.7	5.47	9.5	6.75	11.8	8.17
200	4.9	4.56	6.2	5.67	7.7	7.02	9.6	8.51	11.9	10.50	14.7	12.80
225	5.5	5.77	6.9	7.05	8.6	8.81	10.8	10.8	13.4	13.40	16.6	16.10
250	6.2	7.22	7.7	8.74	9.6	10.91	11.9	13.2	14.8	16.40	18.4	19.90
280	6.9	8.95	8.6	10.92	10.7	13.44	13.4	16.6	16.6	20.33	20.5	24.90
315	7.7	11.20	9.7	13.83	12.1	17.12	15.00	20.9	18.7	26.00	23.2	31.50
355	8.7	14.30	10.9	17.48	13.6	21.2	16.9	26.5	21.1	33.10	26.1	39.90
400	9.8	18.10	12.3	22.25	15.3	27.41	19.1	33.7	23.7	41.80	29.4	50.80

* socket – solvent or rubber ring sell
* Length – 5.80 or 6 meters
* Color – grey or dark grey

6- According to ASTM D 1785 Schedule 40

Nominal diameter	Outside diameter(mm)		thickness		weight	Pressure rating (bar)
	Mini.	Max.	Mini.	Max.	K.gm/ m	
1"	33.27	33.53	3.38	3.89	0.630	31.00
1¼"	42.03	42.29	3.56	4.07	0.830	25.50
1½"	48.11	48.41	3.68	4.19	1	22.80
2	60.17	60.47	3.91	4.42	1.30	19.30
3	88.7	89.1	5.50	6.20	2.14	17.90
4	114.1	114.5	6.02	6.73	3.05	15.20
6	168.0	168.5	7.11	7.98	5.37	12.40
8	218.4	219.4	8.20	9.20	8.11	11.00
10	272.67	273.43	9.27	10.39	13.45	9.70
12	323.47	324.23	10.31	11.55	17.78	9.00

- Color schedule 40 white
- Length 5.8 & 6 meter
- Socket solvent cement

According to ASTM D 1785 Schedule 80

Nominal diameter inch	Outside diameter(mm)		Thickness mm		weight	Pressure rating (psi)
	Mini.	Max.	Mini.	Max	K.gm/ m	
1"	33.27	33.53	4.55	5.08	0.90	43.40
1¼"	42.03	42.29	4.85	5.43	1.10	35.90
1½"	48.11	48.41	5.08	5.69	1.35	32.40
2	60.17	60.47	5.54	6.20	1.80	27.60
3	88.7	89.1	7.62	8.53	2.91	25.50
4	114.1	114.5	8.56	9.58	4.26	22.10
6	168.0	168.5	10.97	12.29	8.13	19.30
8	218.4	219.4	12.70	14.22	10.10	17.20
10	272.67	273.43	15.06	16.87	21.850	15.90
12	323.47	324.23	17.45	19.53	30.00	15.90

Color schedule 80 dark grey
Length 5.8 & 6 meter
Socket solvent cement

U P.V.C sewerage pipes (underground and gravity)

According to DIN 19534

Nominal diameter	Outside diameter(mm)		Thickness mm		Weight kg/m
	Min.	Max.	Min.	Max.	kg/m
110	110	110.30	3.00	3.50	1.63
125	125	125.30	3.00	3.50	1.87
160	160	160.4	3.60	3.60	2.65
200	200	200.4	4.50	5.20	4.12
250	250	250.5	6.10	6.90	7.00
315	315	315.6	7.70	8.70	11.11
400	400	400.7	9.80	11.00	17.8
500	500	500.9	12.2	13.7	27.70
630	630	631.1	15.4	17.20	43.50

* Length – 6 meters
* Color – grey or dark grey
* socket – solvent or ring sell

According to ISO 4435/2003

Nominal diameter	SN 2		SN4		SN 8	
	SDR 51		SDR 41		SDR 34	
	Thick mm	Weight kg/m	Thick mm	Weight kg/m	Thick mm	Weight kg/m
110			3.20	1.64	3.20	1.64
125			3.20	1.82	3.70	2.13
160	3.20	2.41	4.00	2.91	4.70	3.44
200	3.90	3.70	4.90	4.46	5.90	5.37
250	4.90	5.65	6.20	7.06	7.00	8.31
315	6.20	9.02	7.70	11.11	9.20	13.2
355	7.00	11.40	8.70	14.06	10.40	16.70
400	7.90	14.50	9.80	17.80	11.70	21.10
500	9.80	22.36	12.2	27.80	14.6	33.90
630	12.3	35.70	15.40	43.50	18.40	54.60

* Length – 6 meters
* Color – grey or dark grey
* socket – solvent, ring sell Or Plain ends

3- According to B.S EN 1401

Nominal diameter	SN 2		SN4		SN 8	
			SDR 41		SDR 34	
	Thick mm	Weight kg/m	Thick mm	Weight kg/m	Thick mm	Weight kg/m
110	3.00	1.58	3.2	1.70	3.20	1.70
125	3.00	1.81	3.2	1.94	3.70	2.20
160	3.20	2.47	4.00	2.98	4.70	3.56
200	3.90	3.75	4.9	4.65	5.90	5.55
250	4.90	5.85	6.2	7.36	7.30	8.59
315	6.20	9.29	7.7	11.45	9.20	13.60
355	7.00	11.80	8.7	14.56	10.40	17.29
400	7.90	15.00	9.8	18.46	11.70	21.86
450	8.8	18.30	11	23.50	13.2	26.80
500	9.8	22.40	12.3	28.89	14.6	33.90
630	12.3	35.70	15.4	43.50	18.4	52.20

- Color orange
- Length 5.8 & 6 meter
- Socket rubber ring seal
- Solvent or plain ends

4- According to B.S 4660

Nominal diameter	B.S 4660				
	outside diameter mm		Wall thickness mm		weight
	Mani.	Maxi.	Mani.	Maxi	kg/m
110	110	110.4	3.20	3.80	1,64
160	160	160.6	4.10	4.80	3.04

- **Standard B.S 4660**
- **Length 5.80 , or 6 meter**
- **Socket solvent cement SC/J &rubber joint R/J**
- **plain end**
- **Color golden brown**

5- According to B.S 5481

Nominal diameter	outside diameter mm		Wall thickness mm		weight
	Mani.	Maxi.	Mani.	Maxi	kg/m
200	200	200.6	4.9	5.6	4.5
250	250	250.7	6.1	7.00	7.01

- **Standard B.S 5481**
- **Length 5.80 , & 6 meter**
- **Socket solvent cement SC/J &rubber joint R/J**
- **plain end**
- **Color golden brown**

U P.V.C sewerage pipes aboveground for draine, vent and waste

Application according to ASTM D - 2265 (White color)

Nominal diameter	outside diameter mm		Wall thickness mm		weight
	Mani.	Maxi.	Mani.	Maxi	kg/m
1 1/4	42.03	42.29	3.56	4.07	0.65
1 1/2	48.11	48.41	3.68	4.19	0.77
2	60.17	60.47	3.91	4.42	1.04
3	88.7	89.1	5.49	6.15	2.14
4	114.1	114.5	6.02	6.73	3.05
6	168.0	168.56	7.11	7.97	5.37
8	218.7	219.46	8.18	9.17	8.11

- Color white
- Standard length 5,80 and 6 meter
- Socket type plain end or solvent weld cent (Sc/J)

U P.V.C sewerage pipes aboveground and gravity)

According to DIN 19531 for drain

Nominal diameter	outside diameter mm		Wall thickness mm		weight
	Mani.	Maxi.	Mani.	Maxi	kg/m
75	75	75.3	1.8	2.2	0.642
110	110	110.3	2.2	2.7	1.16
125	125	125.3	2.5	3.00	1.48
160	160	160.4	3.2	3.8	2.41

- Length 4 , 5.80 , & 6 meter
- Socket solvent cement – rubber joint
- color grey

PVC-U rubber-ring joint

According to B.S 4514 for soil

Nominal size	outside diameter mm		Wall thickness mm		weight
	Mani.	Maxi.	Mani.	Maxi	kg/m
3 inch	82.4	82.8	3.2	3.8	1.21
4 inch	110	110.4	3.2	3.8	1.64
6 inch	160	160.6	3.3	3.9	2.47

- engtth 4 , 5.80 , & 6 meter
- Socket solvent cement - rubber joint
- Color grey

U P.V.C sewerage pipes aboveground for draine, vent and waste

Application according to B.S 5255 for waste

Nominal size inch	outside diameter mm		Wall thickness mm		weight
	Mani.	Maxi.	Mani.	Maxi	kg/m
32 -(1 1/4)	36.15	36.45	1.8	2.2	0.301
40- (1 1/2)	42.75	43.05	1,9	2.3	0.376
50 (2)	55.75	56.05	2.00	2.4	0.519

- Color grey
- Length 4 , 5.80 , & 6 meter
- Socket solvent cement SC/J &rubber joint R/J – plain end

Nominal size inch	outside diameter mm		Wall thickness mm		weight
	Mani.	Maxi.	Mani.	Maxi	kg/m
32 -(1 1/4)	36.15	36.45	1.8	2.2	0.301
40- (1 1/2)	42.75	43.05	2.3	2.8	0.452
50 (2)	55.75	56.05	2.4	2.9	0.620

-

- color grey
- Length 4 , 5.80 , & 6 meter
- Socket solvent cement SC/J &rubber joint R/J – plain end

U P.V.C pipes duct for telephone cable

1- According to Q – Tel standard The

Duct No.	Outside diameter mm	inside diameter mm	Wall th.mm	Length pipe(mm)	Socket Length(mm)	Weight k.gm
54 D	**96. 5**	**90**	3.25	5.90	100	1.44
56 D	**56. 5**	**50**	3.25	3.07	70	0.85

The Standard Color : All the Ducts & the Bends are Black.
The Socket Type Type : All the Ducts & the Bends are Solvent Weld ,
Application : telephone duct

2- Application according to B.S – 6099 and B.S 50086

Nominal diameter	Mini inside diameter			Maxi. Wall thick.			Weight k gm/m		
	light	medium	heavy	light	medium	Heavy	light	medium	heavy
16	13.7	13.00	**12. 20**	1.15	1.50	1.90	0.080	0.100	0.125
20	17.4	16.90	15.80	1.30	1.55	2.10	0.120	0.140	0.180
25	22.1	21.90	20.60	1.45	1.80	2.20	0.165	0.200	0.240
32	28.6	27.80	26.60	1.70	2.10	2.70	0.245	0.296	0.370
40	35.8	35.40	34.40	2.10	2.30	2.80	0.352	0.406	0.485
50	45.1	44.30	43.20	2.45	2.85	3.40	0.540	0.622	0.707
63	57.00	-----	------	3.00	-----	-----	0.830	----	----

- Length 3 or 2.90 meters
- Color black - white
- Socket plain end – solvent cement SC/J
- Application electrical duct

U P.V.C pipes duct for electrical cable

1- Application according NEMA TC 8 and ASTM F 512

Nominal size inch	outside diameter mm	U P.V.C type EB 135		U P.V.C type DB 120	
		Wall thick. mm	Weight k gm/m	Wall thick. mm	Weight k gm/m
1	33.27	-----	-----	1.52	0.251
1 1/2	48.11	-----	-----	1.52	0.369
2	60.17	1.52	0.465	1.96	0.576
3	88.70	1.93	0.847	3.00	1.250
4	114.1	2.54	1.390	3.91	2.050
5	141.05	3.20	2.09	4.85	3.120
6	168.00	3.86	3.020	5.77	4.420

Type EB 135 - for encased burial in concrete

Type DB 120 - for direct burial without concrete

Pipe length - 6 meters

Color - black or grey

2- Application according to NEMA TC 6 and ASTM F 512

Nominal size inch	outside diameter mm	U P.V.C type EB 20		U P.V.C type DB 60	
		Wall thick. mm	Weight k gm/m	Wall thick. mm	Weight k gm/m
2	60.17	1.52	0.465	1.520	0.465
3	88.70	1.55	O,703	2.340	1.000
4	114.1	2.08	1.170	3.070	1.650
5	141.05	2.62	1.710	3.860	2.500
6	168.00	3.18	2.530	4.620	3.570

Type EB 20 - for encased burial in concrete

Type DB 60 - for direct burial without concrete

Color - black or grey

3- Application according to NEMA TC 2

Nominal diameter inch	outside diameter mm		Maxi. Wall thick.						Weight k gm/m		
			EPT		EPC 40		EPC 80		EPT	EPC 40	EPC 80
	Mini.	Max.	Mini.	Max	Mini.	Max	Mini.	Max			
1/2	21.24	21.44	1.52	2.03	2.77	3.28	3.73	4.24	0.155	0.240	0.300
3/4	26.57	26.77	1.52	2.03	2.87	3.38	3.91	4.24	0.197	0.330	0.430
1	33.27	33.53	1.52	2.03	3.38	3.89	4.55	5.08	0.250	0.480	0.610
1 1/4	42.03	42.29	1.78	2.29	3.56	4.07	4.85	5.44	0.365	0.650	0.870
1 1/2	48.11	48.41	2.03	2.54	3.68	4.19	5.08	5.69	0.470	0.770	1.030
2	60.17	60.47	2.54	3.05	3.91	4.42	5.54	6.20	0.717	1.040	1.430
2 1/2	72.84	73.10	2.79	3.30	5.16	5.77	7.01	7.85	0.952	1.570	2.200
3	88.70	89.10	3.18	3.68	5.49	6.15	7.62	8.53	1.310	2.140	2.910
4	114.1	114.5	3.81	4.32	6.02	6.73	8.56	9.58	2.00	3.050	4.260
5	141.05	141.55	----	----	6.22	7.347	9.52	10.67	----	4.180	6.420
6	168.00	168.56	----	----	7.11	7.98	10.97	12.29	----	5.370	8.130
8	219.08	219.70	----	----	8.18	9.00	12.70	1.200	----	8.143	12.40

EPT electrical plastic duct for encasement in concrete
EPC 40 electrical plastic ducts for normal duty application and direct buried under ground
EPC 80 electrical plastic duct for heavy duty application.
Color - black or grey

Types of insulation UP.V.C pipes

Ring seal installation



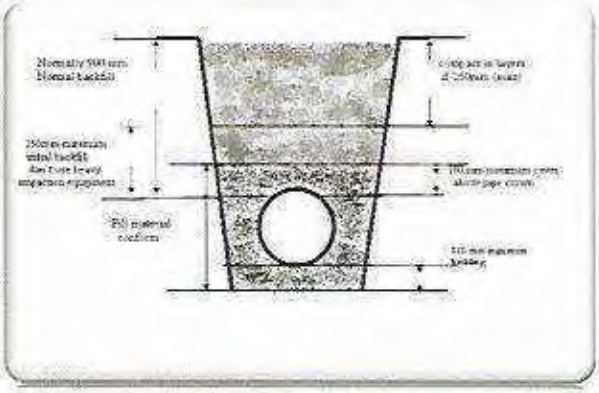

Ring seal installation



Solvent socket

PVC-U solvent cement

Drilling section

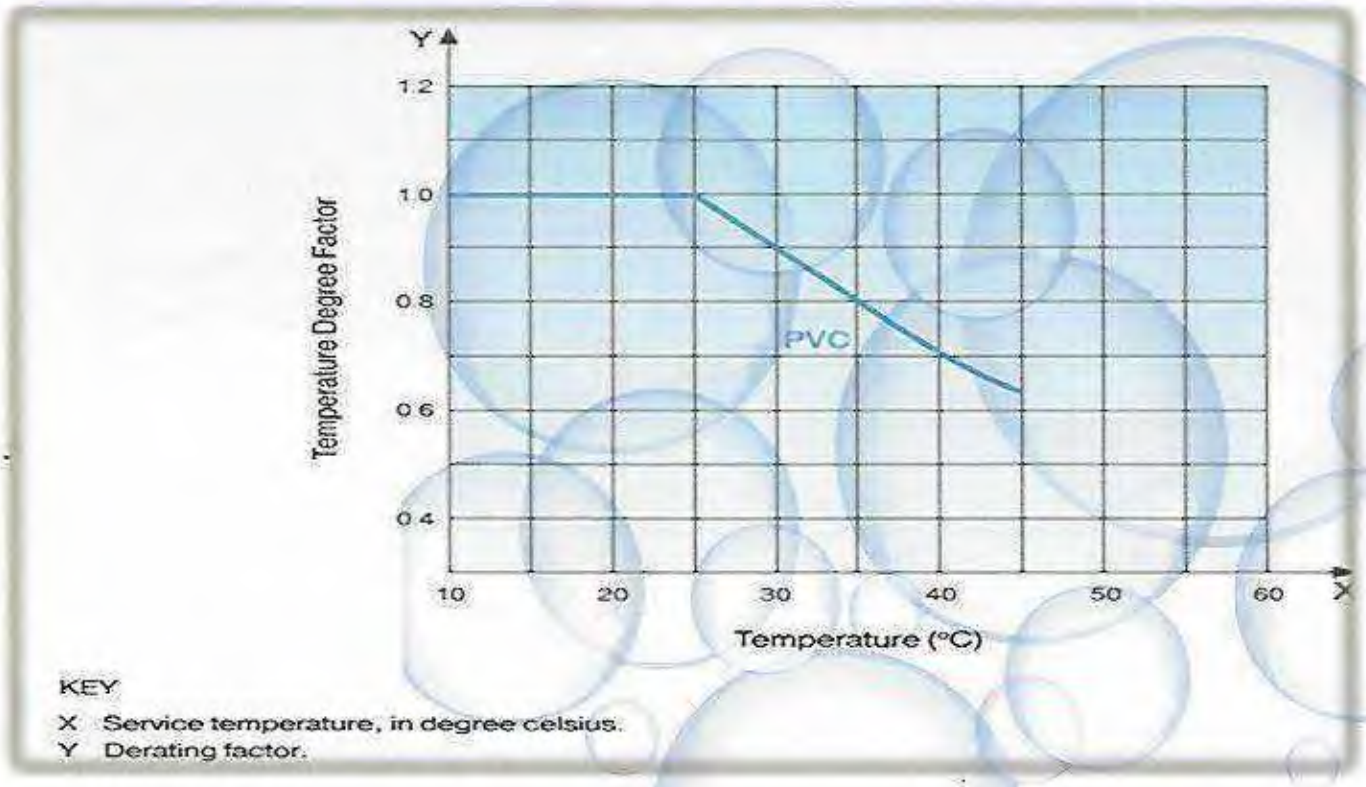


depth and site installation U P.V.C pipes

Minimum Depth of the Covers Lyres(m)	Site installation	
1.20	Middle Road	General Roads
0.90	Side Road	
0.60	Branches Roads	
0.45	Fields and Agriculture Rigouts	

INTERNAL HYDROSTATIC PRESSURE TEST WITH DIFFERENT TEMPRATURE

Material	Temperature					
	20°C	25 °C	30°C	35 °C	40°C	45 °C
U P.V.C	1	1	0.90	0.80	0.71	0.64



KEY

X Service temperature, in degree celsius.

Y Derating factor.

U P.V.C raw materials and final products tests

Raw material tests

1- Visual inspection
2- Bulk density
3- Sieve analysis
4- Humidity (moisture content)

Final products tests

1- Visual inspection
2- Dimension
3- vicat softening point
4- Heat reversion test
5- Impact test
6- Hydrostatic pressure test
7- methylene chloride test
8- Acetone test
9- Dichloromethane test
10- Bending test

Laboratories instruments

1- Internal pressure instrument

It is used to measure internal pressure which record internal pressure value automatically often this value greater than four times standard pressure more over having a computer that record pressure diagram for all tests and can printed it when needed .

2. Impact instrument (free failing) instrument

3- vicat softening point instrument

4- Heat reversion instrument

Handling and storage U P.V.C pipes

Advanced u PVC pipes should be adequately supported during handling and storage, Pipes should not come into severe contact with sharp objects such as corners of truck beds, buildings, forklift trucks or other obstacle on the ground. Forklifts forks must never be inserted into the ends of pipes as a means of lifting or moving. Pipes to be stacked in layers with socket, placed at alternative ends with socket protruding outside.

PVC Pipes should not be exposed to solar radiation for any length of time, ultraviolet rays may cause discoloration. It is recommended stocking pipes in cool ventilated and shady place. For field storage, where racks are not available, the ground should be leveled flat, free from

Coarse stones and dry. Pipes stored should not exceed 1.5 meter height

Types of storages

Single pipes

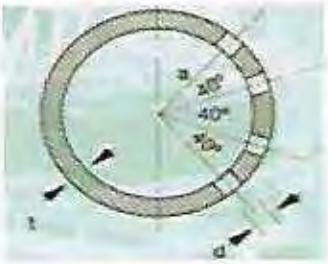
Exchange pipes

Bundle pipes

Perforated U P.V.C pipes

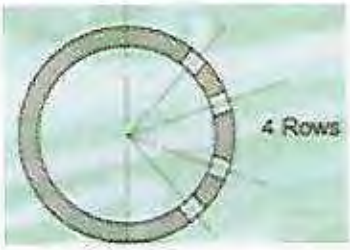
Perforated u P.V.C pipes are manufactured upon request depend on the size of pipes and class of Pipes so there are two types and shapes of perforated pipes shown below or as the client request.

Straight row



Straight Rows

Staggered row



Staggered Rows

Range of sizes	75 mm to 500 mm
Longitudinal Pitch of wholes(LP)	30 mm to 200 mm
Hole Diameter	05 mm to 13 mm
Number of Rows	1 to 6
Angular Pitch of Holes	40 degree for 3 or 4 rows. 40, 80 or 120 degree for 2 rows.

Slotted U P.V.C pipes

Slotted u P.V.C pipes are manufactured upon request according to RAL or the size of pipes and purpose Underground there are two types and shapes of slotted pipes shown below or as the client request.

Straight rows


STRAIGHT SLOTS

staggered rows


STAGGERED SLOTS

- Slot length : Depend to the size
- Sloth width : 1, 1/ 2, & 2 MM
- No. of Row : 4, 6, & 8 (but according to the size)

Advanced plastic factory for H.D.P.E (High Density Poly Ethylene) Pipes

Advantages Of Advanced H.D.P.E. 100 Pipes

1- Good excellent resistance to slow crack growth
2- Good excellent resistance to rapid crack propagation
3- Good excellent resistance to ultra violet ray (U.V.)
4- Good excellent resistance to acids, alkali and salts.
5- Good excellent resistance to impact, broke and Loading.
6- Inside surface is very smooth so prevent any composite,
7- It is very flexible so it is Good excellent resistance to
8- any vibration and water hammer,
9- It is not effect in taste , color and smell any liquid pass it
10- It has long life time about (50 years) or 100 years at 20 c
11- It is not effect in health because have not any toxins,,
12- It is not react with any liquid pass in it so it is best choose to transport Drinking water as compared with any pipes from another material,
13- Excellent corrosion and chemical resistance. Inert to most acidic and alkaline.
14- High flow characteristics.
15- Light in Weight.
16- Easy to handle & transport.
17- Excellent flexibility combined with strength.
18- Safe for potable water supply.
19- Long working life. Minimum 50 years life under normal conditions.
20- High resistance to attack from various types of chemicals. No electrochemical Corrosion.
21- Good flexibility, high resistance to impact resistance to earthquake and twisting.
22- Polyethylene water pipes are produced in black, black with blue Stripes and blue etc.

Applications of H.D.P.E pipes:-

1. Water and sanitation industry.
2. Irrigation system
3. Natural gas n network
4. Fire fighting system.
5. Transmission lines of food.
6. Supply electric and telephone lines (cable duct pipes).
7. Supply lines under channel and railway lions and airport runways.
8. System used in the injection water form oil wells.

Specification & Reference H.D.P.E100 pipes

H.D.P.E pressure pipes
1 – QCS /2014
2 – ISO 4427 / 2019
3 – EN 12201 part 1&2
4 – DIN 8074 & 8075
5 – ISO 728 (thermal stability (O.I.T.)

Chemical Resistance Chart Report

Flow through substance	Propt. %	Performance at 20 C	40C	60C
Magnesium Hydroxide	GL	.	.	.
Magnesium Sulphate	Any	.	.	.
Malic Acid	50	.	.	.
Malic Acid	GL	.	.	.
Magnanese sulphate		.	.	.
Methane Gaseous	TR	.	.	.
Methnanl (Methyl alcohol)	Any	.	.	.
Methyl sulphuric Acid	50	.	.	.
Millk	H	.	.	.
Mineral water	H	.	.	.
Nickel Salts	GL	.	.	.
Nitric Acid	25	.	.	.
Nitric Acid	65	.	.	.
Nitric Acid	75	.	.	.
Oxalic Acid	GL	.	.	.
Oxygen	TR	.	.	.
Ozone	GL	.	.	.
Perchloric Acid	20	.	.	.
Perchloric Acid	50	.	.	.
Perchloric Acid	70	.	.	.
Petroleum (Kerosene)	TR	.	.	.
Petrol Regular Grade	H	.	.	.
Photographic Developer	H	.	.	.
Photographic Emulsion	H	.	.	.
Phenol resin mould audstances		.	.	.
Phosphates	Any	.	.	.
Phosphoroxichloride		.	.	.
Phosphoric Acid	50	.	.	.
Phosphoric Acid	95	.	.	.
Phtalic Acid	50	.	.	.
Phtalic Acid	GL	.	.	.
Phtalic Acid Ester		.	.	.
Potassium Cadmium Cyanide	Any	.	.	.
Potassium Chloride	Any	.	.	.
Potassium chromate	40	.	.	.
Potassium chromate	GL	.	.	.
Potassium Fluoride	Any	.	.	.
Potassium Nitrate	Any	.	.	.
Potassium Permanganate	20	.	.	.

Flow through substance	Propt. %	Performance at 20 C	40C	60C
Potassium Permanganate	GL	.	.	.
Potassium Phosphate	Any	.	.	.
Propane Gaseous	TR	.	.	.
Propane Liquid	TR	.	.	.
Propylene Chloride	100	.	.	.
Rinsing Agents	H	.	.	.
Salicylic Acid	GL	.	.	.
Salt (Sodium Chloride)	Any	.	.	.
Seawater	H	.	.	.
Silver Nitrate	Any	.	.	.
Sodium Fluoride	GL	.	.	.
Sodium Bicarbonate	GL	.	.	.
Sodium Bisulphite	Any	.	.	.
Sodium Bisulphite	Any	.	.	.
Sodium Hydroxide (Caustic soda)	Any	.	.	.
Sodium Nitrate	Any	.	.	.
Sodium Peroxide	10	.	.	.
Sodium phosphate	GL	.	.	.
Sodium Silicate (Water Glass)	Any	.	.	.
Sulphur	TR	.	.	.
Sulphuric Acid	70	.	.	.
Sulphuric Acid	90	.	.	.
Tannic Acid (tannine)	10	.	.	.
Tartaric Acid	Any	.	.	.
Uric Acid	GL	.	.	.
Urine	33	.	.	.
Vinegar (Wine Vinegar)	H	.	.	.
Vinyl Acetate	TR	.	.	.
Vitamin C (Ascorbic Acid)		.	.	.
Wine	H	.	.	.
Zinc Carooste	GL	.	.	.
Zinc chloride	Any	.	.	.
Zinc oxide	GL	.	.	.
Zinc Salts	Any	.	.	.
Zinc stearate		.	.	.
Zinc Sulphate	Any	.	.	.

Explanation or discussion of chemical resistance of materials

We can classify polyethylene pipes resistance to effects of chemical compounds with various concentrations into three types

1. Chemical compounds that have no effect on polyethylene pipes.	
2. Chemical compounds which slightly affect on polyethylene pipes.	
3. Chemical compounds that affect on the pipes.	

And here is a list of symbols and abbreviations that explain the composition and effect of liquids when it flows inside polyethylene pipe

%	percentage refer to mass proportion in %
VL	aqueous solution, mass proportion ≤10 %
L	aqueous solution, mass percent ≥10 %
GL	aqueous solution, saturated at 20 0 C
TR	chemical is at least technical pure
H	normal commercial composition
S	trace < 0.1 %
G	usual mass proportion of any saturated solution of dilution.

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GL	aqueous solution, saturated at 20 0 C
TR	chemical is at least technically pure
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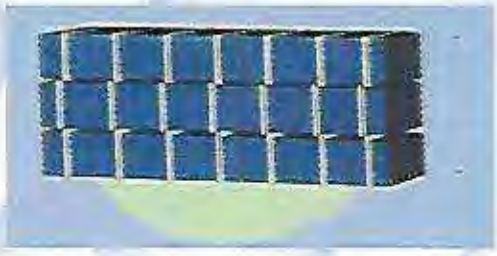
S	traces < 0.1 %
G	sual mass proportion of any saturated solution of dilution

Handling and storage H.D.P.E pipes

Types of storage

The single pipes storing

the bundles pipes storing



Types of handling and transportion

Laboratories instruments

1-Tension and elongation instrument

It involves the short-time tensile properties of thermoplastic and profile pipes and:
- Tensile strength for yield or maximum levels of load
- determining the breaking elongation

It is applied to all thermoplastic pipes. Tensile properties test is used to Determine the properties of materials used in pipe production.
That is, the material's mechanical properties and its reaction
Against force are examined and the tensile strength is determined.
The test is conducted as follows (EN 638):
A-type spoon samples are taken out of the strips cut in parallel with the axis of the pipe and they are conditioned in 23 °C.
The sample is fit between the upper and lower claws of the tensile testing device.
The Lo length of the conditioned samples is measured and recorded. The wall thickness of the sample is also measured and recorded.
Cross-sectional area is calculated

2- Melt flow rate instrument

It is the determination of mass flow rate (MFR) of the melted thermoplastic materials under certain heat and loading conditions. It is the mass measuring method. MFR can be determined out of MVR calculations if melted mass density under testing temperature and pressure is known. (MVR: Melting Volumetric Rate) In principle, it can be applied to thermoplastics whose rheological properties are affected by hydrolysis, condensation and cross linking during measurement.
MFR value depends on whether the polymer chains are long or short. In shorter chains, it is easier for the links to mix together. So, flow rate is more than that of longer chains. MFR's unit is considered dg/min, whereas the unit accepted nowadays is gram in 10 minutes. (G/10 minutes)
The test is conducted as follows (ISO 1133):
- The device is switched on and heated until 190 °C.
- The sample pieces to be tested are put in the cylinder on the device.
- The automatic cutting time is encoded in the device so that materials that are 15mm in average can flow.
- 5 pieces except the first several pieces are weighed precision balance, their mean value is calculated and MFR value as g/minute is measured by the formula.

The massive flow rate (MFR) of the materials is calculated as g/10 minutes by using the equation below:

3- Density Instrument

Density is the mass (m) of a matter per unit volume (V) and is stated as kg/m3,kg/dm3 or kg/L. Density depends on the divaricates of the polymer chain . As the divaricated in the polymer chain increases, crystallization will decrease and density will decrease in parallel with that. As density increases, viscosity will also increase and permeability will decrease. Thus, the hardness of the formed material will increase. As density decreases, viscosity will decrease and brittleness will increase. In order to determine the mass of the material in unit volume, the material is weighed in the precision balance first in the air and then in liquid and its density is calculated.

The test is conducted as follows (ISO 1183):

4- Carbon Black contents

It is used for the purpose of determining the percentage of the carbon amount that is added homogeneously into the sample in the refinery environment in order to make it more resistant to UV rays. That is, carbon black is used both as a colorant and as UV stabilizer. It provides a very effective protection for pipes that are exposed to sun light against UV radiation. This effective protection depends on the carbon amount in the material

The test is conducted as follows (ISO 6964):

5- Carbon Black Dispersion

Carbon black needs to disperse homogeneously in the product. Without a homogeneous Dispersion, some parts of the product will be affected by environmental conditions Such as heat and solar radiation. These affected parts will be weaker than other parts of the product and will start to break down quickly. The product will crisp and start to Crack. Consequently, carbon black dispersion in the product is crucial.

The test is conducted as follows (ISO 11420):

-The sample that will be analyzed is examined under the microscope.

-Conformity to standard is observe

6- Pigment Dispersion

Factors that affect carbon black dispersion are also valid for pigment dispersion. If the pigments are not dispersed homogeneously, breakdowns are observed. As blue and yellow pigments do not act as UV stabilizers, extra UV stabilizer must be added to the material.

The test is conducted as follows (ISO 11420):

- The sample to be analyzed is examined under the microscope.
- Conformity to standard is observe

7 – Determination of Oxidation-Induction Time

It is used to certain stability of H.D.P.E. material & Final product and this machine give results automatically It is the time during which the antioxidant matter in the polyethylene material prevents the material from being oxidized by oxygen under high-temperature environment.

This experiment measures how well the material is stabilized. If the material is not stabilized well, it starts to break down in extrusion or high-temperature practices.

The test is conducted as follows (TS EN 728):

Advanced plastic factory raw material properties

PHYSICAL PROPERTIES OF PE RESIN (PE 100)

S. No.	Property	Typical Value	Test Method
1.	Density (Base Resin)	≥ 930 gm/cm³	ISO 1872-2/ISO1183
2.	Melt Flow Rate (190°C/5.0 Kg.	0.2 - 1.4 g/10 min.	ISO 1133
3.	Elongation at Break	≥ 350 %	ISO 527-2
4.	Carbon Black Content	2-25 %	ISO 6964
5.	Oxidation Induction Time (210°C)	≥ 20 min.	EN 728

Raw material tests for H. D.P.E

Property	Typical Value	Test Method
Visual Inspection	Color-shape	DIN 8074/8075
Density	≥ 0.930g /cm³	ISO 1183 & F.S 1832
Melt Flow Rate (190-5 Kg)	0.2 – 1.4 g/10 min.	ISO 1133
Thermal Stability	≥ 20 min.	ISO 728 OR 10837
Carbon Black Content	2% - 2.5 %	ISO 6964

Final products tests

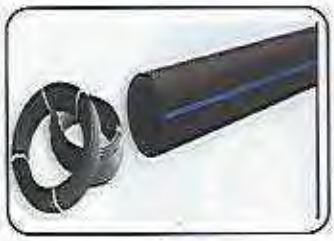
Properties	Unit	Standard Value	References
Visual Inspection			DIN 8075/8074
Dimension measuring		Inside tolerance	DIN 8075/8074
Elongation at break	%	≥ 350	ISO 527-2
Oxidation Induction Time	Min	≥ 20	ISO 728
Long term pressure test	Bar	100 h 20°C = 12 Mpa	DIN 8075
Long term pressure test	Bar	1000 h 80°C = 5 Mpa	DIN 8075

Internal Diameter For H.D.P. E according To SDR

D	PRESSURE						
	4	6	8	10	12.5	16	20
	Standard Dimension Ration SDR						
	SDR 41	SDR 26	SDR 21	SDR 17	SDR 13.6	SDR 11	SDR 9
	Inner d	Inner d	Inner d	Inner d	Inner d	Inner d	Inner d
10	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-
20	-	-	-	-	16.4	16.2	15.4
25	-	-	-	21.4	21.2	20.4	19.4
32	-	-	-	28.2	27.2	26.2	24.8
40	-	36.4	36.2	35.2	34.0	32.6	31.0
50	-	46.0	45.2	44.0	42.6	40.8	38.8
63	59.4	58.0	57.0	55.4	53.6	51.4	48.8
75	71.2	69.2	67.8	66.0	63.8	61.4	58.2
90	85.6	83.0	81.4	79.2	76.6	73.6	69.8
110	104.6	101.6	99.4	96.8	93.8	90.0	85.4
125	118.8	115.4	113.0	110.2	106.6	102.2	97.0
140	133.0	129.2	126.6	123.4	119.4	114.6	108.6
160	152.0	147.6	144.6	141.0	136.4	130.8	124.2
180	171.2	166.2	162.8	158.6	153.4	147.2	139.8
200	190.2	184.6	180.8	176.2	170.6	163.6	155.2
225	214.0	207.8	203.4	198.2	191.8	184.0	174.6
250	237.6	230.8	226.2	220.4	213.2	204.6	194.2
280	266.2	258.6	253.2	246.8	238.8	229.2	217.4
315	299.6	290.8	285.0	277.6	268.6	257.8	244.6
355	337.6	327.8	321.2	312.8	302.8	290.6	275.6
400	380.4	369.4	361.8	352.6	341.2	327.4	310.6
450	428.0	415.6	407.0	396.6	383.8	368.2	349.4
500	475.4	461.8	452.2	440.6	426.4	409.2	388.4
560	532.6	517.2	506.6	493.6	477.6	458.4	388.4
630	599.2	581.8	570.0	555.2	537.4	515.6	
710	675.2	655.6	642.2	625.8	605.6	595.6	
800	760.8	738.8	723.8	705.2	682.4	671.0	
900	856.0	831.2	814.2	793.1	767.8		
1000	951.0	923.6	904.6	881.4			
1200	1141.2	1108.2	1185.6				

Allowable working pressure of pipes made from H.D.P.E. 100
Conveying water, with a safety factor of 1.25

Temp °C	Years of Service	pressure						
		4	6	8	10	12.5	16	20
		Standard dimension ratio (SDR)						
		41	26	21	17	13.6	11	9
		Allowable working pressure						
10	5	5.0	7.9	10.1	12.6	15.7	20.2	25.2
	10	4.9	7.8	9.9	12.4	15.5	19.8	24.8
	25	4.8	7.6	9.6	12.1	15.1	19.3	24.2
	50	4.7	7.5	9.5	11.9	14.8	19.0	23.8
	100	4.6	7.3	9.3	11.6	18.6	18.7	23.3
20	5	4.2	6.6	8.4	10.6	13.2	16.9	21.2
	10	4.1	6.5	8.3	10.4	13.0	16.6	20.8
	25	4.0	6.4	8.1	10.1	12.7	16.2	20.3
	50	4.0	6.3	8.0	10.0	12.5	16.0	20.0
	100	3.9	6.1	7.8	9.8	12.2	15.7	19.6
30	5	3.6	5.6	7.2	9.0	11.2	14.4	18.0
	10	3.5	5.5	7.0	8.8	11.0	14.1	17.7
	25	3.4	5.4	6.9	8.6	10.8	13.8	17.2
	50	3.3	5.3	6.7	8.4	10.6	13.5	16.9
40	5	3.0	4.8	6.1	7.7	9.6	12.3	15.4
	10	3.0	4.7	6.0	7.6	9.5	12.1	15.2
	25	2.9	4.6	5.9	7.4	9.2	11.8	14.8
	50	2.9	4.5	5.8	7.2	9.1	11.6	14.5
50	5	2.6	4.2	5.3	6.7	8.3	10.7	13.4
	10	2.6	4.0	5.2	6.5	8.1	10.4	13.0
	15	2.3	3.7	4.7	5.9	7.4	9.5	11.8
60	5	1.9	3.0	3.8	4.8	6.0	7.7	9.7
70	2	1.5	2.4	3.1	3.9	4.9	6.2	7.8



* Methods of H.D.P.E100 Pipes welding

In our company we use different ways to weld pipes as:

1- Electro fusion coupler, it is more expensive and caused problems because there are different in outside diameters between pipes and couplers.

2- Butt welding fusion, and it is the best way to connect H.D.P.E100 pipes because we not use any fitting to weld it and it is very safety.

Fabrication machines

Butt welding machines

installation in the fields

versus Temperature up to 40 °C* Pressure Reduction factor

Applicable to 50- year Lifetime (according to ISO 4427)

Material	Temperature				
	20 °C	25 °C	30 °C	35 °C	40 °C
H.D.P.E	1	0.9	0.81	0.72	0.62

* Flexibility and bending radial

One of the major benefits of PE is its flexibility and this can be utilized to full advantage for buried pipework. Gradual changes of direction up to 11.5° can normally be accommodated by the pipe itself, without the need for additional fittings and the costs of jointing.

Following rules of thumb apply for the allowable bending radius (depending on the ambient temperature)

For P.E pipes system SDR 17 & SDR 11respectively

at 20°C: 15-20 x DN
at 0°C: 35-40 x DN

As an example:

a DN 200 SDR 17 pipe at 20°C can be bent with a radius of 20 x 200 mm = 4 m.

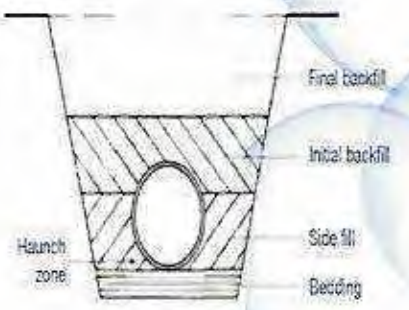
Pressure test water mains

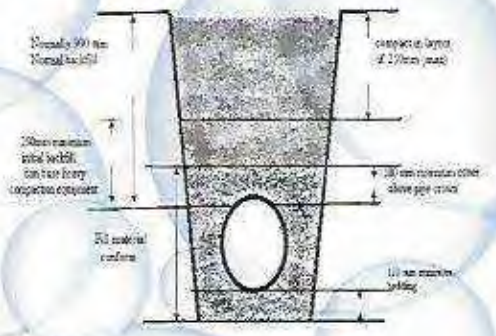
For testing water mains, guidance in provided in EN 805. According to this European standard, the test pressure, related to the nominal pressure, PN, shall be:

The drilling section and trench for H.D.P.E100 PIPES

1,5 x PN
or :
PN + 5 bar

whichever is the least





Application	Potable Water and Pressurized sewerage Network													
Color	Black													
Material	PE 100													
Working pressure (bar)	4		6		8		10		12.5		16		20	
SDR (DIS)	41		26		21		17		13.6		11		9	
Outside diameter (mm)/ weight (kg/m)	S (mm)	Weight kg/m	S (mm)	Weight kg/m	S (mm)	Weight kg/m	S (mm)	Weight kg/m	S (mm)	Weight kg/m	S (mm)	Weight kg/m	S (mm)	Weight kg/m
20									1.8	0.107	1.9	0.112	2.3	0.133
25							1.8	0.137	1.9	0.144	2.3	0.171	2.8	0.200
32							1.9	0.187	2.4	0.232	2.9	0.272	3.6	0.327
40			1.8	0.227	1.9	0.239	2.4	0.295	3.0	0.356	3.7	0.430	4.5	0.509
50			2.0	0.314	2.4	0.374	3.0	0.453	3.7	0.549	4.6	0.666	5.6	0.788
63	1.8	0.364	2.5	0.494	3.0	0.580	3.8	0.721	4.7	0.873	5.8	1.050	7.1	1.260
75	1.9	0.457	2.9	0.675	3.6	0.828	4.5	1.020	5.6	1.240	6.8	1.470	8.4	1.760
90	2.2	0.643	3.5	0.978	4.3	1.180	5.4	1.460	6.7	1.770	8.2	2.120	10.1	2.540
110	2.7	0.943	4.2	1.430	5.3	1.770	6.6	2.170	8.1	2.620	10.0	3.140	12.3	3.780
125	3.1	1.230	4.8	1.840	6.0	2.270	7.4	2.760	9.2	3.370	11.4	4.080	14.0	4.870
140	3.5	1.540	5.4	2.320	6.7	2.830	8.3	3.460	10.3	4.220	12.7	5.080	15.7	6.110
160	4.0	2.000	6.2	3.040	7.7	3.720	9.5	4.520	11.8	5.500	14.6	6.670	17.9	7.960
180	4.4	2.490	6.9	3.790	8.6	4.670	10.7	5.710	13.3	6.980	16.4	8.420	20.1	10.100
200	4.9	3.050	7.7	4.690	9.6	5.780	11.9	7.050	14.7	8.560	18.2	10.400	22.4	12.400
225	5.5	3.860	8.6	5.890	10.8	7.300	13.4	8.930	16.6	10.900	20.5	13.100	25.2	15.800
250	6.2	4.830	9.6	7.300	11.9	8.930	14.8	11.000	18.4	13.400	22.7	16.200	27.9	19.400
280	6.9	5.980	10.7	9.100	13.4	11.300	16.6	13.700	20.6	16.800	25.4	20.300	31.3	24.300
315	7.7	7.520	12.1	11.600	15.0	14.200	18.7	17.400	23.2	21.200	28.6	25.600	35.2	30.800
355	8.7	9.550	13.6	14.600	16.9	18.000	21.1	22.100	26.1	26.900	32.2	32.500	39.7	39.100
400	9.8	12.100	15.3	18.600	19.1	22.900	23.7	28.000	29.4	34.100	36.3	41.300	44.7	49.600
450	11.0	15.300	17.2	23.500	21.5	28.900	26.7	35.400	33.1	43.200	40.9	52.300	50.3	62.700
500	12.3	19.000	19.1	28.900	23.9	35.700	29.7	43.800	36.8	53.300	45.4	64.500	55.8	77.300
560	13.7	23.600	21.4	36.200	26.7	44.700	33.2	54.800	41.2	66.900	50.8	80.800	62.5	97.000
630	15.4	29.900	24.1	45.900	30.0	56.400	37.4	69.400	46.3	84.600	57.2	102.000		
710	17.4	38.000	27.2	58.400	33.9	71.800	42.1	88.100	52.2	107.000	64.5	130.000		
800	19.6	48.100	30.6	73.900	38.1	91.100	47.4	112.000	58.8	136.000				
900	22.0	60.900	34.4	93.400	42.9	115.000	53.3	141.000	66.1	172.000				
1000	24.5	75.200	38.2	115.000	47.7	142.000	59.3	175.000						
1200	29.4	108.000	45.9	166.000	57.2	205.000								
Reference	DIN 8074-8075													

Medium density polyethylene (M.D.P.E)

General properties and benefits

1- It is light in weight
2- Resistance to corrosion attack
3- It is high coefficient to thermal expansion
4- It is susceptible to U V degradation
5- It is not intended for above ground and outdoor use.
6- Chemical resistance
7- It is easy to handling
8- It is good excellent to slow crack propagation
9- It is excellent to rapid crack propagation
10- It is good suitable for potable water
11- Taste and odor neutral

M.D.P.E 80 Material data sheet

Property	PE 80	Unit	Test Method
	Value		
Density (Compound)	956	Kg/m^3	ISO 1183
Melt Flow Rate (MFR) 190°C / 5.0 Kg.	0.2-1.4	g/10 min.	ISO 1183
Elongation at Break	> 350	%	ISO 527-2
Hardness, Shore D	59	-	ISO 868
Carbon Black Content	2 - 25	%	ASTM 1603
Thermal Stability (210°C)	> 20	min.	EN 728
Total Volatiles	≤ 350	mg/kg	EN 12009
Water Content	≤ 300	mg/kg	EN 12118

PE 80 pressure pipes for water supply according to DIN 8074/8075

Nominal Outside Diameter (mm)	SDR 41 S 20 PN 4		SDR 33 S 16 PN 4		SDR 22 S 10.5 PN 6		SDR 13.6 S 6.3 PN 10		SDR 11 S 5 PN 12.5		SDR 9 S 4 PN 16	
	Wall Thickness (mm)	Weight kg/m	Wall Thickness (mm)	Weight kg/m	Wall Thickness (mm)	Weight kg/m	Wall Thickness (mm)	Weight kg/m	Wall Thickness (mm)	Weight kg/m	Wall Thickness (mm)	Weight kg/m
16	-	-	-	-	-	-	-	-	-	-	1.8	0.084
20	-	-	-	-	-	-	1.9	0.107	1.9	0.112	2.3	0.133
25	-	-	-	-	-	-	1.9	0.144	2.3	0.171	2.8	0.200
32	-	-	-	-	-	-	2.4	0.232	2.9	0.272	3.6	0.327
40	-	-	-	-	1.9	0.230	3.0	0.356	3.7	0.430	4.5	0.509
50	-	-	1.8	0.287	2.3	0.361	3.7	0.549	4.6	0.666	5.6	0.788
63	1.8	0.364	2.0	0.390	2.9	0.560	4.7	0.873	5.8	1.05	7.1	1.26
75	1.9	0.497	2.3	0.551	3.5	0.807	5.6	1.24	6.8	1.47	8.4	1.78
90	2.2	0.643	2.8	0.791	4.1	1.14	6.7	1.77	8.2	2.12	10.1	2.54
110	2.7	0.943	3.4	1.17	5.0	1.67	8.1	2.62	10.0	3.14	12.3	3.76
125	3.1	1.23	3.9	1.51	5.7	2.16	9.2	3.37	11.4	4.08	14.0	4.87
140	3.5	1.54	4.3	1.88	6.4	2.72	10.3	4.22	12.7	5.08	15.7	6.11
160	4.0	2.0	4.9	2.42	7.3	3.54	11.8	5.60	14.6	6.67	17.9	7.96
180	4.4	2.49	5.5	3.07	8.2	4.47	13.3	6.98	16.4	8.42	20.1	10.1
200	4.9	3.05	6.2	3.84	9.1	5.57	14.7	8.56	18.2	10.4	22.4	12.4
225	5.5	3.88	6.9	4.77	10.3	7.00	16.6	10.9	20.5	13.1	25.2	15.6
250	6.2	4.83	7.7	5.92	11.4	8.59	18.4	13.4	22.7	16.2	27.9	19.4
280	6.9	5.96	8.6	7.40	12.8	10.6	20.6	16.8	25.4	20.3	31.3	24.3
315	7.7	7.52	9.7	9.37	14.4	13.6	23.2	21.2	28.4	25.6	35.2	30.5
355	8.7	9.55	10.9	11.9	16.2	17.3	26.1	26.9	32.2	32.5	39.7	39.1
400	9.8	12.1	12.3	15.1	18.2	21.9	29.4	34.1	36.3	41.3	44.7	49.6
450	11.0	15.3	13.8	19.0	20.5	27.7	33.1	43.2	40.9	52.3	50.3	62.7

- M.D.P.E 80 pipes
- MRS = 8 m pa
- C – 1.25
- OS = 6.4 m pa

Relation between SDR and nominal pressure
At C = 1.25 and temp. 20C and life time 50 years

Nominal Pressure PN Bar	SDR PE 80
3.2	41
4	33
5	26
6	22
6.3	21
8	17
10	13.6
12.5	11
16	9
20	7.4
25	6

raw material tests

1- visual inspection
2- Melt flow rate
3- Oxidation induction time
4- Moisture content
5- Density
6- Carbon content

Final product tests

1- Visual inspection
2- Dimension
3- Tensile stress
4- Elongation
5- Oxidation induction time
6- Pressure test

M.D.P.E 80 pressure pipes for water supply according to ISO 4427

	SDR 41	SDR 26	SDR 17	SDR 13.6	SDR 11	SDR 9
	S 20	S 12.5	S 8	S 6.3	S 5	S 4
	Nominal pressure (PN)					
PE 80	PN 3.2	PN 5	PN 8	PN 10	PN 12.5	PN 16
Nominal Outside Diameter (mm)	Wall Thickness (mm)	Wall Thickness (mm)	Wall Thickness (mm)	Wall Thickness (mm)	Wall Thickness (mm)	Wall Thickness (mm)
16	-	-	-	-	-	2.0
20	-	-	-	-	2.0	2.3
25	-	-	-	2.0	2.3	3.0
32	-	-	2.0	2.4	3.0	3.6
40	-	-	2.4	3.0	3.7	4.5
50	-	2.0	3.0	3.7	4.6	5.6
63	-	2.5	3.8	4.7	5.8	7.1
75	-	2.9	4.5	5.6	6.8	8.4
90	-	3.5	5.4	6.7	8.2	10.1
110	-	4.2	6.6	8.1	10.0	12.3
125	-	4.8	7.4	9.2	11.4	14.0
140	-	5.4	8.3	10.3	12.7	15.7
160	-	6.2	9.5	11.8	14.6	17.9
180	-	6.9	10.7	13.3	16.4	20.1
200	-	7.7	11.9	14.7	18.2	22.4
225	-	8.6	13.4	16.6	20.5	25.2
250	-	9.6	14.8	18.4	22.7	27.9
280	-	10.7	16.6	20.6	25.4	31.3
315	7.7	12.1	18.7	23.2	28.6	35.2
355	8.5	13.6	21.1	26.1	32.2	39.7
400	9.8	15.3	23.7	29.4	36.3	44.7
450	11.0	17.2	26.7	33.1	40.9	50.3

1- M.D.P.E 80 Raw material test

All raw materials are inspected and tested for every batch number

test	Standard value	Reference
Visual inspection	Color shape	DIN 8074/8075
Density	≥ 0.930 g/cm³	ISO 1183 & E. S1832
Carbon black content	2% - 2.5%	ISO 6964
Oxidation induction time	> 20 min	ISO 728 or ISO 10834
Melt flow rate	0.2 - 1.40 g/10min	ISO 1133

2-M.D.P.E 80 pipes Final products tests

All final products tests and inspection every shift

Test	Units	Standard Value	Reference
Visual inspection			DIN 8075/8074
Dimensional measuring Diameter-wall thickness-length-ovality		INSIDE TOLERENCE	DIN 8075/8074
Elongation at break	%	>350	ISO 527-2
Oxidation induction time	MIN	>20	ISO 728
Long term hydrostatic pressure test at 20 c	BAR	100h 20 C = 12 M pa	DIN 8075
Long term hydrostatic pressure test at 80 c	BAR	1000h 80 C = 5 M pa	DIN 8075
Vicat softening point	C	>119	ISO 306

Advanced Plastic Factory
Double Wall Corrugated PE Pipe Machine
Description and Specification

Advanced Plastic Factory Double Wall Corrugated Machine Specification

Size Range

- Range size: (HDPE (DWC) From ID 200mm - ID 800mm

Material

- HDPE Material Class

Description of DWC Pipes

- DWC (HDPE Corrugated Pipes) Type B SN 8

Socket Type

- Rubber Ring Seal (EPDM) Type

Length

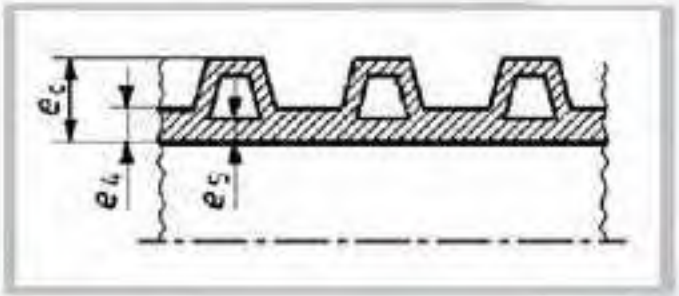
- 6 Meters normal or as per ASHGHAL requirements

TECHNICAL DATA SHEET

HDPE DOUBLE WALL CORRUGATED PIPES (BS EN 13476 – 3:2018)

Raw Material	Socket	SN	Type
HDPE	Ribbed Integral Socket	SN 8	Type B

DN (mm)	OD (mm)	ID (mm)	Thickness e4 (mm)	Thickness e5 (mm)
150	172	145	1.3	1.1
200	228	195	1.5	1.1
300	343	294	2.0	1.7
400	460	392	2.5	2.3
500	585	490	3.0	3
600	702	588	3.5	3.5
700	820	688	4.1	4.1
800	933	785	4.5	4.5



Corrosion Process

Anaerobic bacterial decomposition of sewage

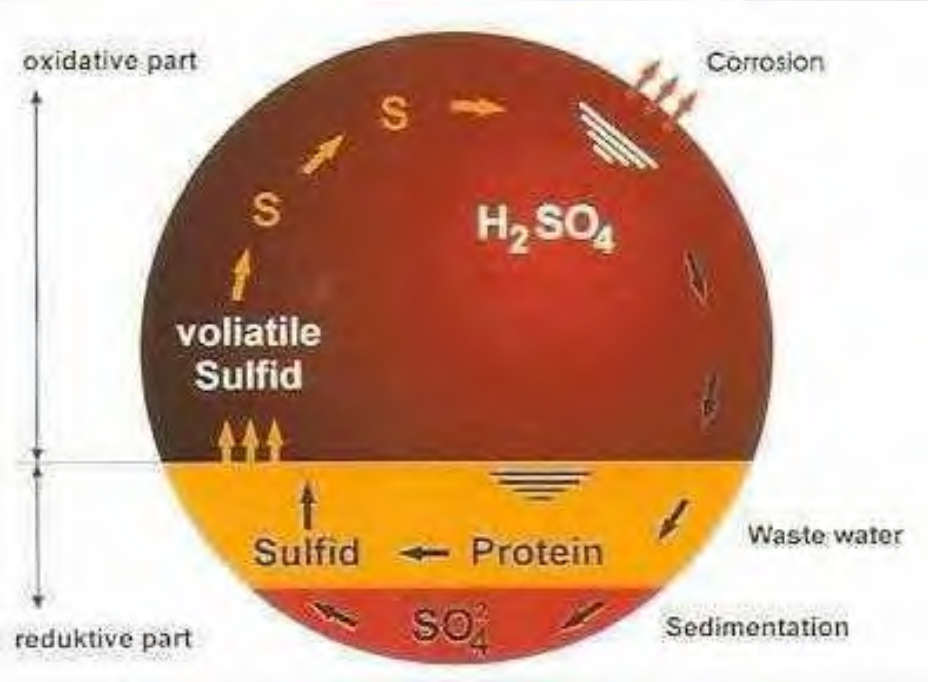
Formation of Hydrogen sulfide (H_2S)

H_2S + Moist air = Sulfuric acid

Reaction with metal or concrete to form water soluble products

Corrosion process takes place at metal reinforcement

Solid particles in sewage increase the abrasion



Corrugated PE Pipes

Three Types of Design for Corrugated Pipes.

Type: B

- **Pipe is a full circular dual-wall cross-section, with an outer corrugated pipe wall and a smooth inner liner. with Integral Socket EPDM Rubber Ring Seal.**

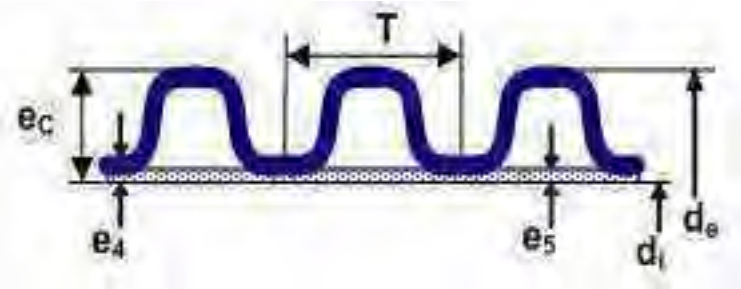
DWC PE Pipes - Concept

1) Double wall corrugated pipes represent a modern concept, optimized for maximum efficiency in underground sewer systems.

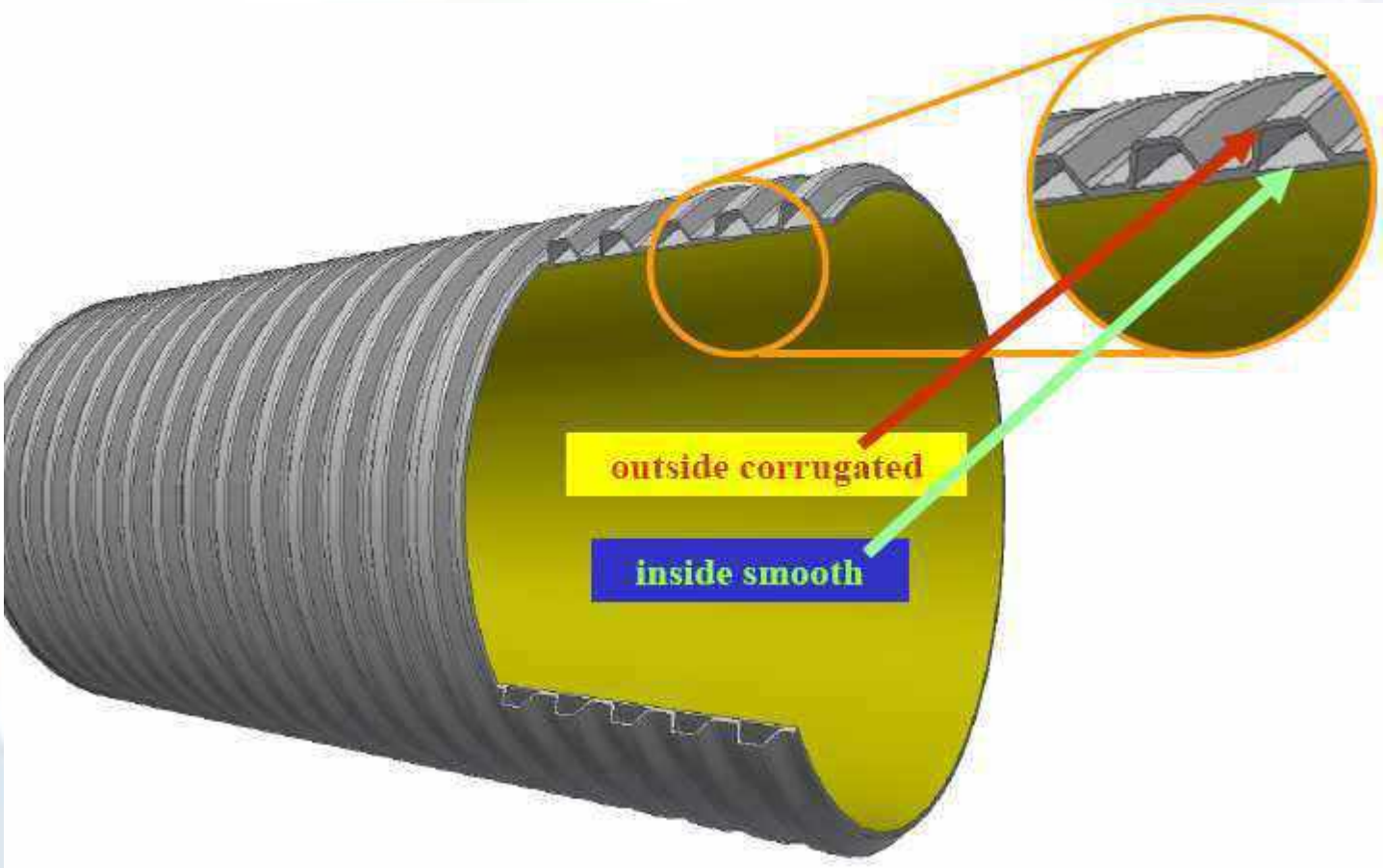
2) The interior wall, made of high density polyethylene forms the flowing channel for fluid transport.

3) The exterior profiled wall insures a high ring stiffness, an optimal balance between flexibility and rigidity, good grip in the soil due to its shape, it allows for a small curve, etc.

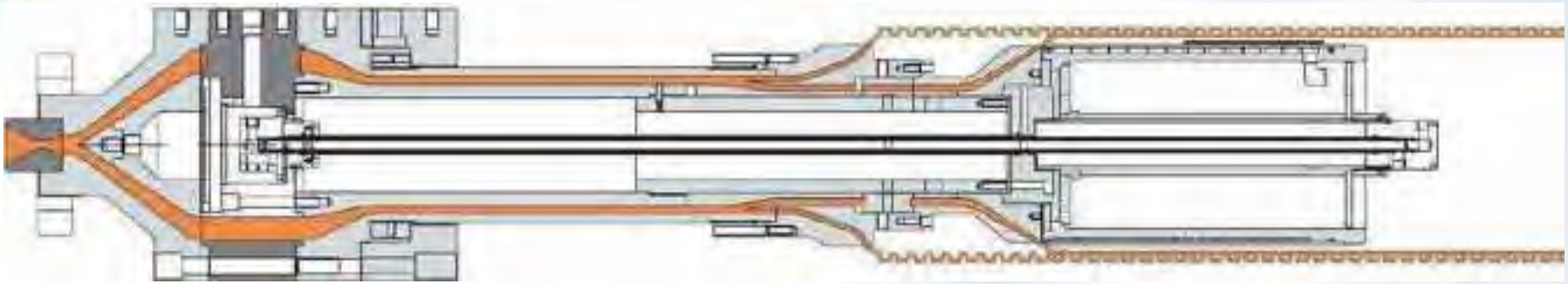
4) At the same time, the specific weight is significantly reduced compared to the solid wall systems, with advantages in handling, storage and installation.



Structure of DWC PE Pipes



DWC PE Pipes Manufacturing



Extrusion machine for Double wall corrugated pipe

DWC PE Pipes Corrugators

Pipe making line

Extrusion line for double wall corrugated pipe

DWC PE Pipes – Features

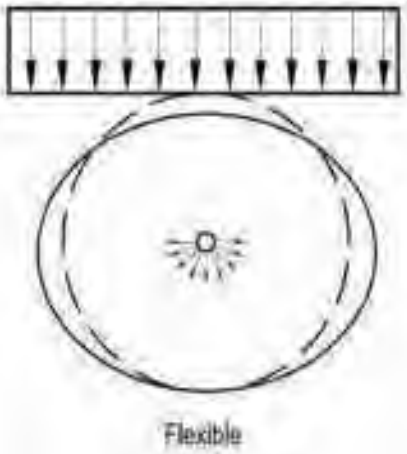
- Corrosion Resistant
- Lightweight
- High Flexibility
- **DWC Pipes**
- Material Saving
- Better ring stiffness
- Better hydraulic properties
- Good abrasion resistance

Double Wall Corrugated PE Pipes (DWC)

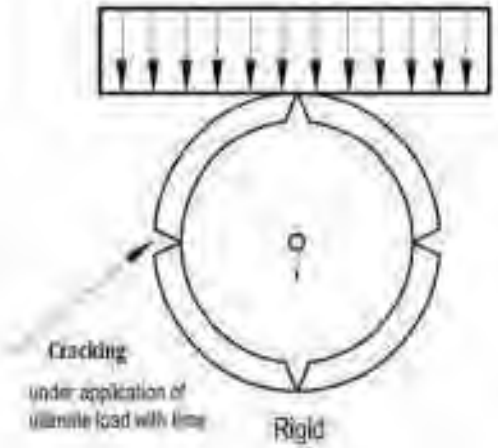
- DWC PE pipes are pipes with full circular dual-wall cross section, with an outer corrugated pipe wall and a smooth inner surface. The structural stability of corrugated HDPE pipe is produced by corrugations on exterior surface of the pipe.
- DWC PE pipes are popular for large diameter application due to their capacity to transfer the load to adjacent soil resulting in long term structural stability.

- Benefits - Optimum combination of toughness, strength & stiffness
  Lightweight & Cost effective due to hollow wall structure
  Low transportation & installation cost
- Major International Standards – BS EN 13476, DIN 16961, BS EN 1277, UK WIS 4-35-01 - Specification for thermoplastics structured wall pipes, joints and couplers with a smooth bore for gravity sewers for the size range 150-900 inclusive.
  UK WIS 4-35-01 - Specification for thermoplastics structured wall pipes – supplementary test requirements.

Features DWC PE Pipes



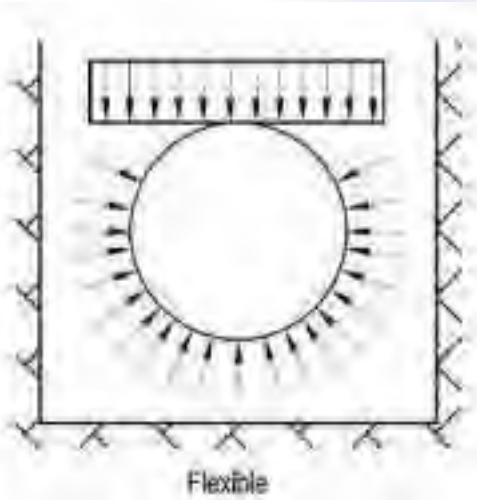
DWC PE



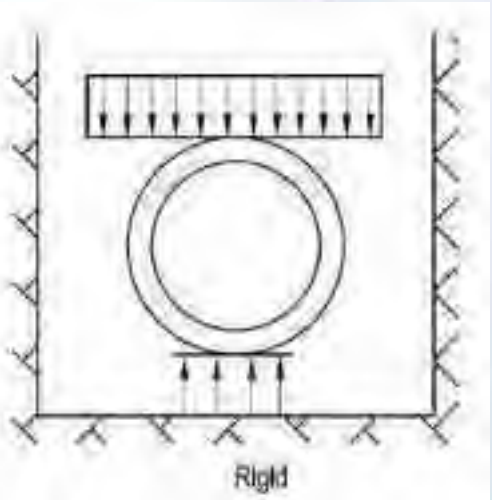
RCC

Flexible to adjust with the load by deflection

Load is distributed to soil

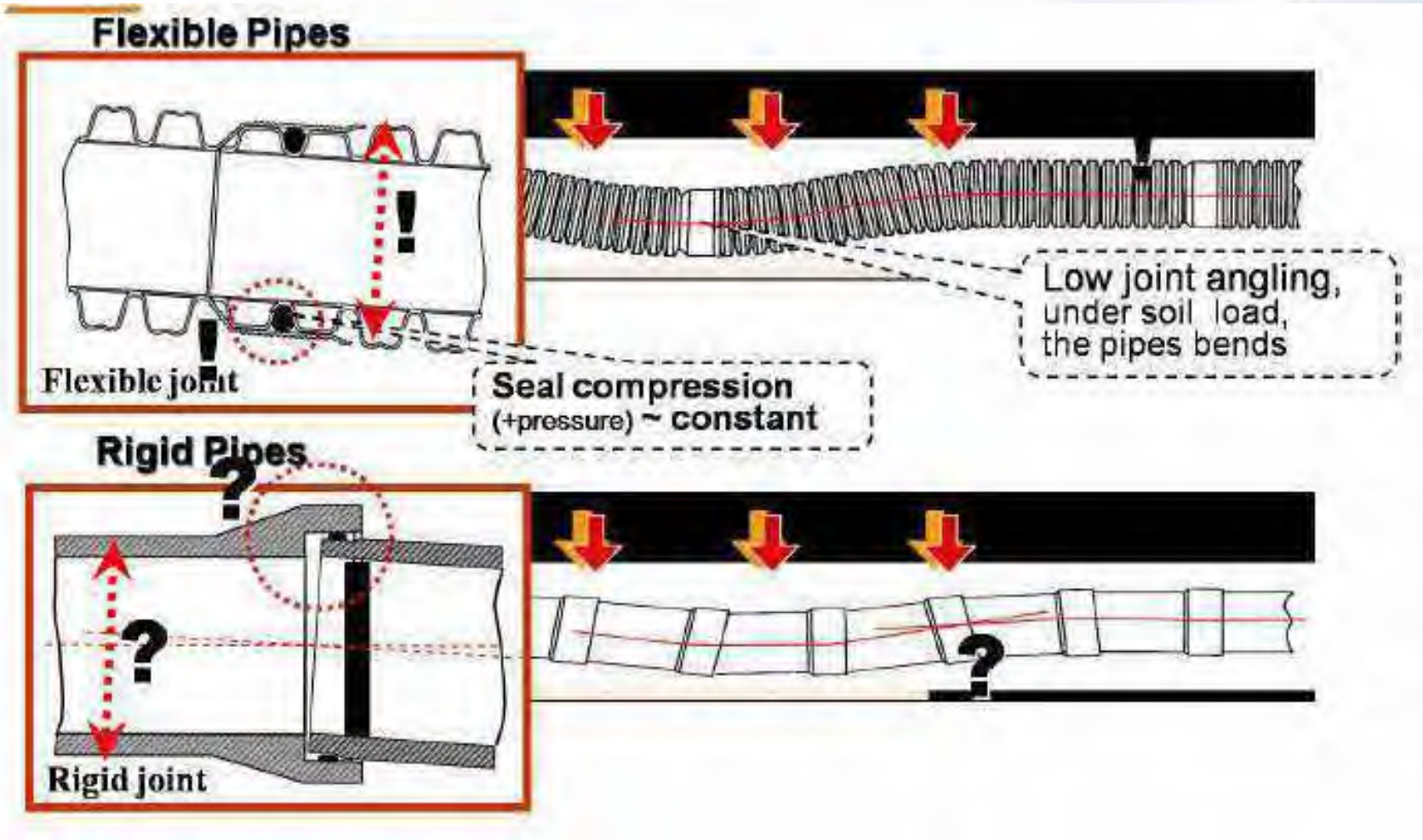


DWC PE



RCC

Features DWC PE Pipes



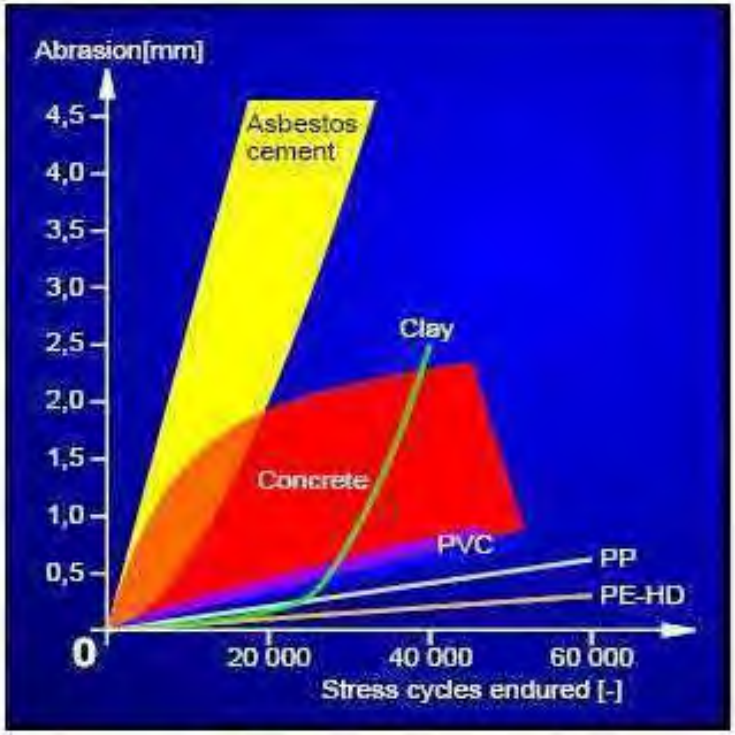
Features of DWC PE Pipes

Stiffness classes:

SN 8 For Ashghal Specification

Preferred stiffness class for sewer pipes

Features of DWC PE Pipes

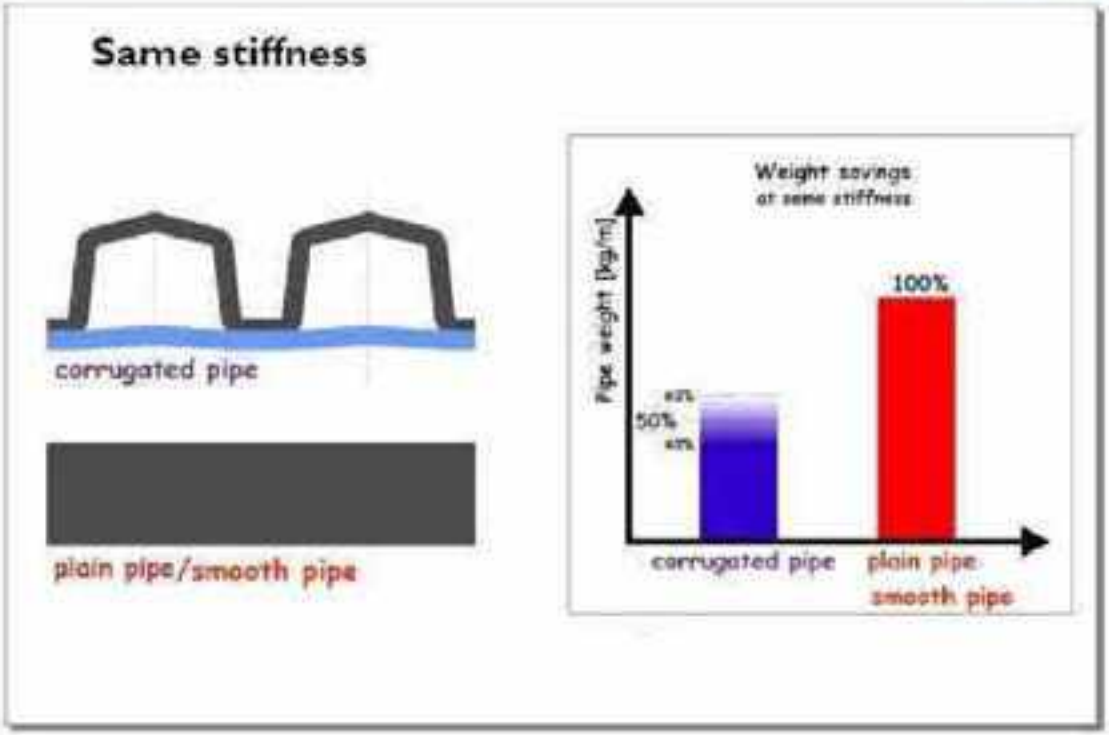


Abrasion of different materials („Darmstädter Methode“)

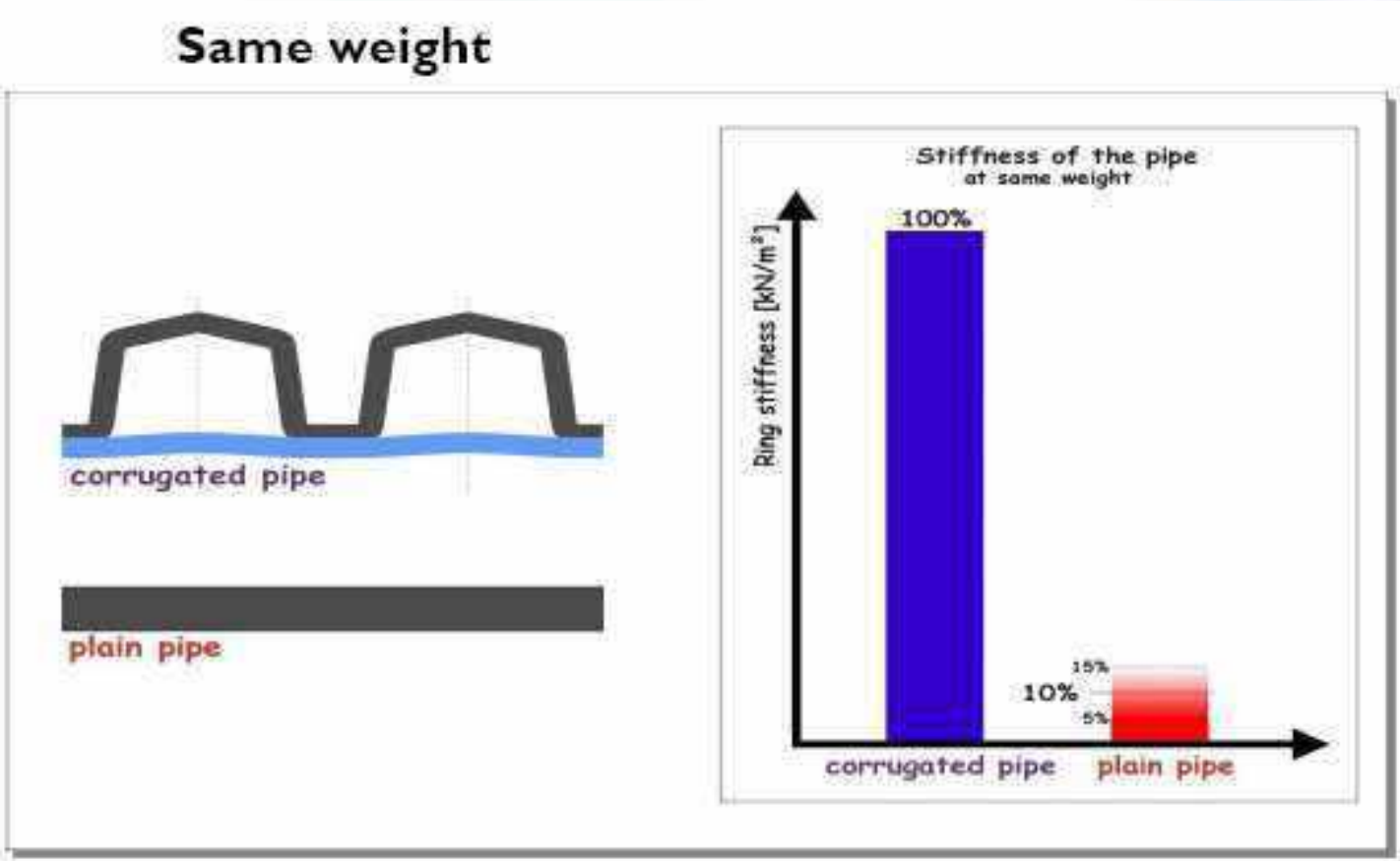
Test machine

TECHNISCHE UNIVERSITÄT DARMSTADT

Comparison with Solid Wall PE Pipes



Comparison with Solid Wall PE Pipes



Jointing of DWC PE Pipes (EPDM)

Put elastomeric ring on first corrugation

Fix the ring

Ensuring ring is placed properly

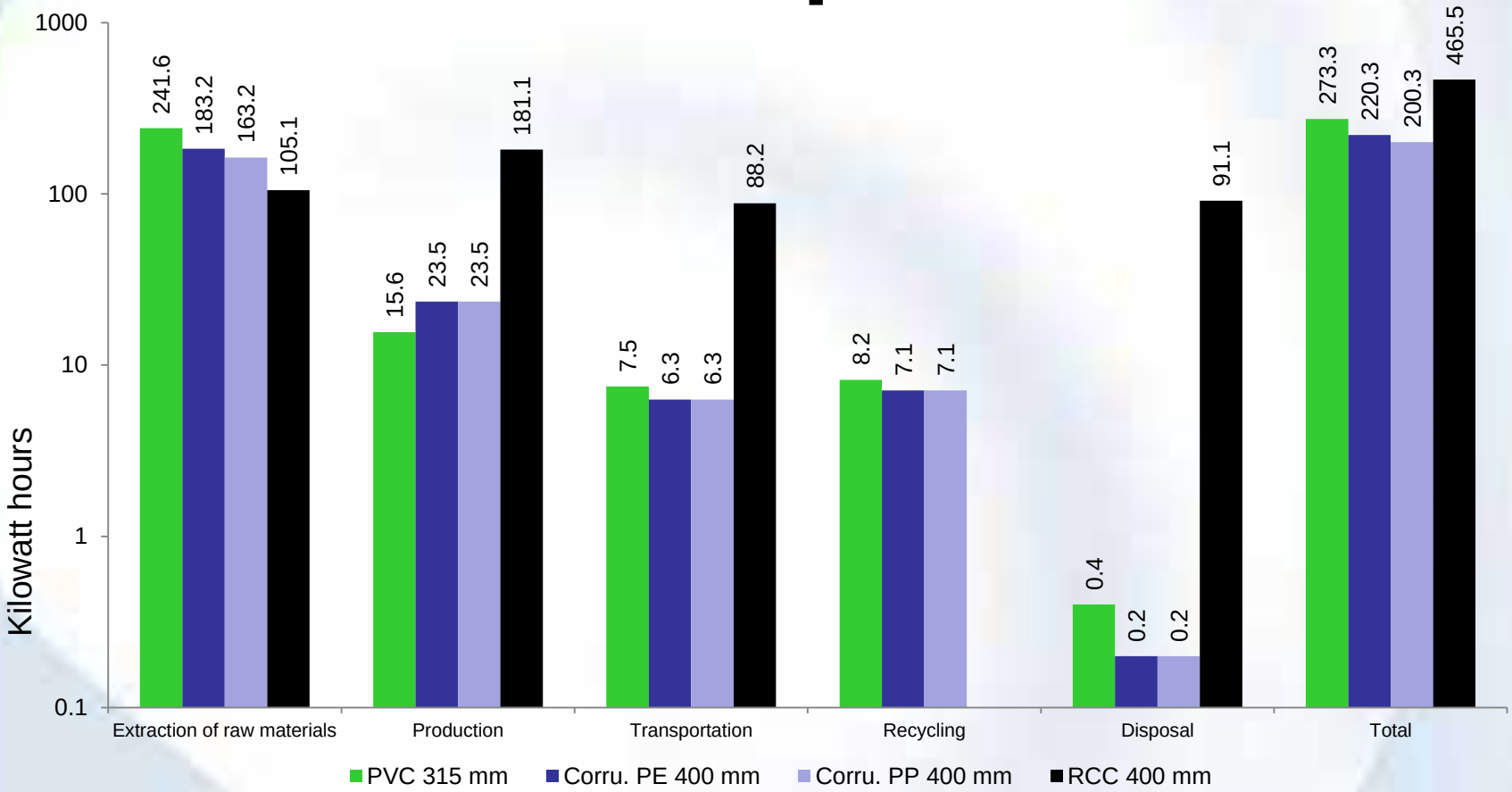
Bring pipe ends close and mount jointing device

Pushing ends to fix the pipes

DWC PE Pipes - Applications

1) Underground sewer systems
2) Foul sewer systems
3) Industrial Waste Water Systems
4) Surface Water & Ground
5) Storm Water Drainage
6) Cable ducting
7) Culvert and Cross Drainage

Energy Efficiency through PE Sewer Pipes



Pipe diameters considered are PVC -315 mm, Corru. PE – 400 mm, Corru PP – 400 mm and RCC – 400 mm to maintain same flow rate in all three pipelines

Energy requirement values given are calculated for 3 meter length for all pipes.

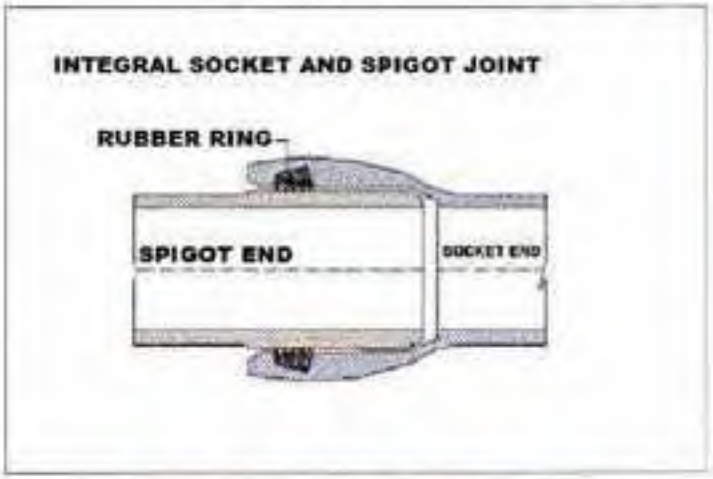
Source: Life Cycle Study by Universitat Politecnica De Catalunya, Barcelona

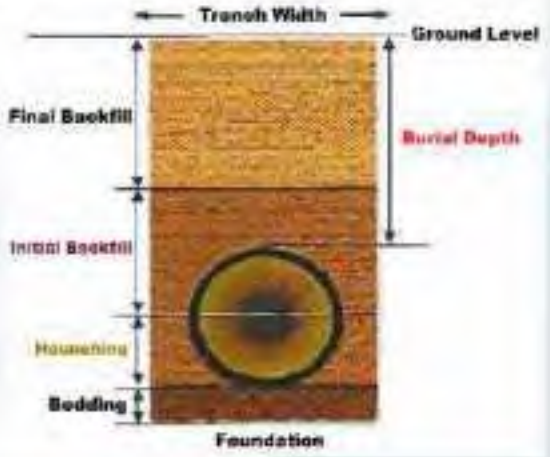
Comparison of DWC/CI/RCC Pipes

Property	DWC PE Pipes	RCC Pipes (Reinforce Cement Concrete Pipes)	CI Pipes (Cast Iron Pipes)
Material Cost	Low	High	Very high
Transportation Cost	Low due to light in weight	High due to heavy weight	High due to heavy weight
Excavation Cost	Low due to smooth inner surface	High due to rough surface	Medium
Installation Cost	Low (no special machinery required)	High due to heavy weight	High due to heavy weight
Joining Cost	Low due to push fit jointing	High	High
Maintenance Cost	Low due to best corrosion resistance	High	High
Repair Cost	Low	High	High
Cost of inconvenience	Nil	High	High

DWC Installations

Integrally Socketed Pipes





Connections: Pipe to Fitting / Double-End Socket

Clean pipe ends, rubber rings and internal faces of the socket with soap water

Insert rubber ring onto the second valley of the pipe

Align and insert socket into pipe

Push socket into pipe carefully, ensuring that the socket ends are protected from damage

Align the next pipe with the socket and repeat Step 1 and 2

Pipe is pushed into the socket to complete the connection

Connections: Pipe to Integral Bell End

Clean pipe end, rubber ring and internal faces of bell end with soap water

Insert rubber ring onto second valley of the pipe

Push the pipe into integral bell end

Example of a complete connection

Manhole Connections

Grouting WEIDA DWCP to a concrete manhole

Connection of Weida DWCP to Floline 3-W manhole

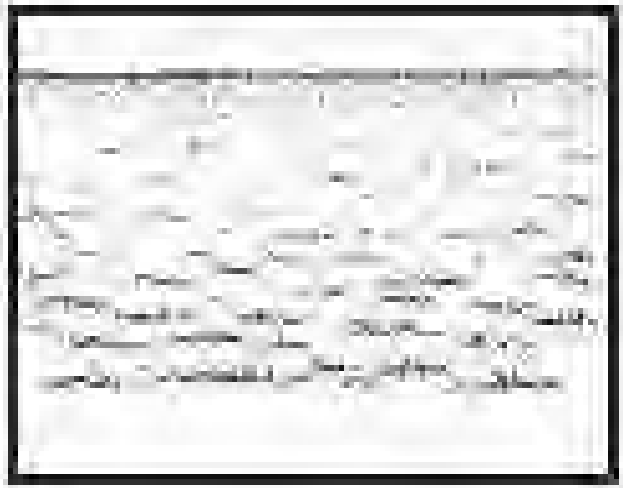
Advanced Plastic Factory Storage and Handling Instructions/Guides for HDPE Double Wall Corrugated Pipes

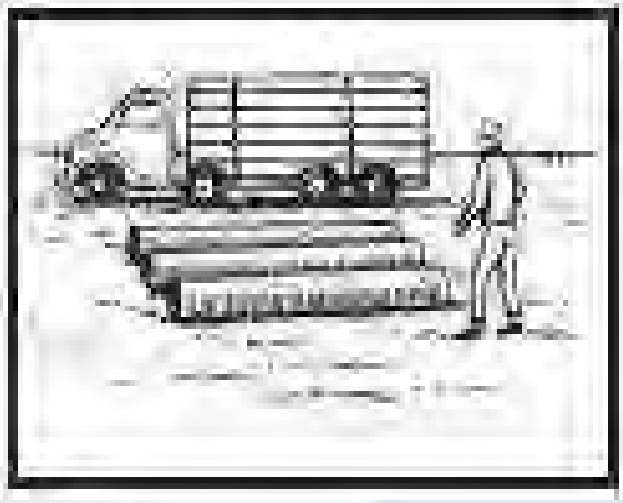
Job Site Handling and Receiving

Receiving Recommendations

Our distributors and customer service personnel make service and customer satisfaction their highest priority. If your order is incorrect, contact your distributor or our customer service personnel.

- Direct driver to a smooth, flat area, free of rocks and debris.
- Examine load quantities and quality immediately after unloading.Inspect pipe carefully for possible damage from transportation or unloading.
- Note damaged or missing items on delivery receipt.
- Shortages and damaged material are not automatically reshipped. Reorder replacement material.
- Do not dispose of damaged items. Check with driver for proper return method. If driver is unsure, contact our customer service personnel.

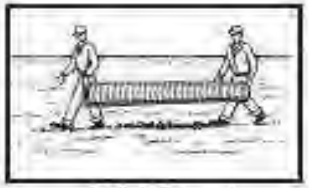




Handling Recommendations

To avoid damage to the pipe and fittings the following handling recommendations should be followed:

- OSHA safety requirements.
- Do not drop pipe.
- Avoid any impact to the bell or spigot.
- 18" (450mm) and smaller pipe can be moved by hand. Larger pipe requires a backhoe with a nylon sling.



≤18" (450mm)

24"-30" (600-750mm)

≥36" (900mm)

- Contractor assistance is required to unload palletized pipe.
- Do not use a loading boom or forklift directly on or inside pipe.

Table 1:

Recommended Handling Method for Pipe			
Diameter in. (mm)	HDPE Approx. lb/ft (kg/m)	HP DW Approx. lb/ft (kg/m)	Handling Method*
4 (100)	0.44 (.65)	n/a	Labor
6 (150)	0.85 (1.3)	n/a	Labor
8 (200)	1.5 (2.2)	n/a	Labor
10 (250)	2.1 (3.1)	n/a	Labor
12 (300)	3.2 (4.8)	3.6 (5.4)	Labor
15 (375)	4.6 (6.9)	5.3 (7.9)	Labor
18 (450)	6.4 (9.6)	7.1 (10.5)	Labor
24 (600)	11.0 (16.4)	11.9 (17.7)	Sling (1 point)
30 (750)	15.2 (22.6)	16.8 (24.9)	Sling (1 point)
36 (900)	19.8 (29.5)	20.3 (30.2)	Sling (2 points)
42 (1050)	24.3 (36.1)	24.3 (36.1)	Sling (2 points)
48 (1200)	30.9 (45.9)	32.4 (48.2)	Sling (2 points)
54 (1350)	36.5 (54.0)	n/a	Sling (2 points)
60 (1500)	44.5 (66.3)	49.6 (73.8)	Sling (2 points)

Job Site Pipe Storage:

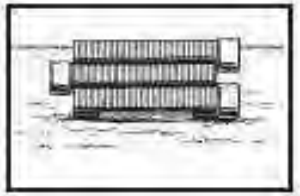
Storage Recommendations

To ensure that your delivered pipe products do not become damaged during job site storage, follow these simple guidelines:

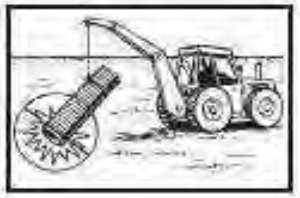
- Non-palletized pipe may be temporarily stockpiled on a flat, clear area.
- Use securing timbers (or blocks) to ensure the stockpile does not collapse.
- Failure to block pipe may result in stack collapsing, pipe damage, or personal injury.

- Stack pipe no higher than approximately 6 feet (1.8m).

- While supporting lengths of pipe evenly, alternate bells for each row of pipe.



- To prevent damage to the bell or spigot when moving pipe sections, do not drag or strike pipe ends against anything.




THANK
YOU

Bureau Veritas Certification

ADVANCED PLASTIC FACTORY

ZONE 81, STREET NO. 2, BUILDING 156, NEW INDUSTRIAL AREA, P.O. BOX: 16150, DOHA, STATE OF QATAR

Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

ISO 9001:2015

Scope of certification

MANUFACTURE OF UPVC, HDPE, MDPE, HDPE DOUBLE WALL CORRUGATED PIPES AND FABRICATED FITTINGS.

Original Cycle Start Date:	**01-10-2016**
Expiry date of previous cycle:	**NA**
Certification / Recertification Audit date:	**NA**
Certification / Recertification cycle start date:	**17-09-2022**
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on:	**30-09-2025**

Certificate No.: **QA003112** Rev: 1 Issue date: **17-09-2022**

Vinoth. K.P - Certification Manager

0008

Certification Body Address: 5th Floor, 66 Prescot Street, London, E1 8HG, United Kingdom

Local Office: Bureau Veritas International Doha W.L.L, First Floor, D-Ring Road, Building No. 35, Street No. 250, Zone 45, Old Airport Area, P.O. Box 22157, Doha, State of Qatar

Further clarifications regarding the scope and validity of this certificate, and the applicability of the management system requirements, please call: +97440329729

Bureau Veritas Certification

ADVANCED PLASTIC FACTORY

ZONE 81, STREET NO. 2, BUILDING 156, NEW INDUSTRIAL AREA, P.O. BOX: 16150, DOHA, STATE OF QATAR

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ISO 14001:2015

Scope of certification

MANUFACTURE OF UPVC, HDPE, MDPE, HDPE DOUBLE WALL CORRUGATED PIPES AND FABRICATED FITTINGS.

Original Cycle Start Date:	**01-10-2016**
Expiry date of previous cycle:	**NA**
Certification / Recertification Audit date:	**NA**
Certification / Recertification cycle start date:	**17-09-2022**
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on:	**30-09-2025**

Certificate No.: **QA003111** Rev: 1 Issue date: **17-09-2022**

Vinoth. K.P - Certification Manager

0008

Certification Body Address: 5th Floor, 66 Prescot Street, London, E1 8HG, United Kingdom

Local Office: Bureau Veritas International Doha W.L.L, First Floor, D-Ring Road, Building No. 35, Street No. 250, Zone 45, Old Airport Area, P.O. Box 22157, Doha, State of Qatar

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Bureau Veritas Certification

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ISO 45001:2018

Scope of certification

MANUFACTURE OF UPVC, HDPE, MDPE, HDPE DOUBLE WALL CORRUGATED PIPES AND FABRICATED FITTINGS.

Original Cycle Start Date:	**22-11-2020**
Expiry date of previous cycle:	**NA**
Certification / Recertification Audit date:	**NA**
Certification / Recertification cycle start date:	**17-09-2022**
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on:	**30-09-2025**

Certificate No.: **QA003113** Rev: 1 Issue date: **17-09-2022**

Vinoth. K.P - Certification Manager

0008

Certification Body Address: 5th Floor, 66 Prescot Street, London, E1 8HG, United Kingdom

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BUREAU VERITAS

Certificate of Product Conformity

BVI.DOA.20.IND.319.49.CPC.01.2021

Job Description : Conformity assessment of a product

Product Name : **Polyethylene (PE) Pipes for Water Supply**

Product range : **From 20mm to 900mm**
Manufacturer : Advanced Plastic Factory W.L.L., New industrial Area- Qatar.
Date of Inspection : 28th November 2021

Scope of work:

1. Review of Quality Plan
2. Review of QA/QC Procedures
3. Review of Personnel Competency
4. Carry out a site visit during production
5. Review of test equipment & calibration record

Documents Referenced:

1. ISO 4427-1-2019
2. ISO 4427-2-2019
3. QCS 2014-Section 8 Part3

Result of Inspection: The product of **Polyethylene (PE) Pipes for Water Supply** range from **20- 900mm**, manufactured and tested by Advanced Plastic Factory WLL (Qatar) have been evaluated and found in conformity against the requirements of the standard ISO 4427 Part 1 2019 , ISO 4427 Part 2 2019 and QCS 2014-Section 8 Part3

This note is issued further to an inspection whose duration and scope were limited by the terms and conditions of the contract with BV principal. This note is NOT an indication that the item(s) is (are) fit for any specific purpose and does not release the manufacturer, supplier and any party from their respective duty, guarantee, obligation and/or indemnity relating to, without limitation, patents, workmanship, materials, safety, performance in operation and /or reliability.

This Certificate is valid for 1 Year from the date of issue.

Survey Carried out by : **Prakash Mani**
Certificate issued by : **Prakash Mani**
Date of issue : **28/11/2021**
Certificate Number : **BVI.DOA.20.IND.319.49.CPC.01.2021**
Inspection Center : **Doha, Qatar**

BV STAMP

BUREAU VERITAS

Certificate of Product Conformity

BVI.DOA.20.IND.154.49.CPC.01

Job Description	: Conformity assessment of a product
Product Name	: **(High Density Polyethylene) for Double Wall Corrugated Pipes, TypeB-SN8**
Product range	: **From ID 200mm to ID 800mm**
Manufacturer	: Advanced Plastic Factory W.L.L., New Industrial Area- Qatar.
Date of Inspection	: 06/01/2022, 09/01/2022 & 11/01/2022

Scope of work:

1. Review of Quality Plan
2. Review of QA/QC Procedures
3. Review of Personnel Competency
4. Carry out a site visit during production
5. Review of test equipment & calibration record

Documents Referenced:

1. BS EN 13476-3: 2018
2. DIN 16961
3. Ashghal Proposed Amendment to QCS 2014-Section 8 Part3

Result of Inspection: The product of **(High Density Polyethylene) for Double Wall Corrugated Pipes, TypeB-SN8** range from **ID 200mm to ID 800mm**, manufactured and tested by Advanced Plastic Factory WLL (Qatar) have been evaluated and found in conformity against the requirements of the standard BS EN 13476-3: 2018 , DIN 16961 and Ashghal Proposed Amendment to QCS 2014-Section 8 Part3

This note is issued further to an inspection whose duration and scope were limited by the terms and conditions of the contract with BV principal. This note is NOT an indication that the item(s) is (are) fit for any specific purpose and does not release the manufacturer, supplier and any party from their respective duty, guarantee, obligation and/or indemnity relating to, without limitation, patents, workmanship, materials, safety, performance in operation and /or reliability.

This Certificate is valid for 1 Year from the date of issue.

Survey Carried out by	:	**Ayman Shaaban**
Certificate issued by	:	**Ayman Shaaban**
Date of issue	:	**14/01/2022**
Certificate Number	:	**001/2022**
Inspection Center	:	**Doha, Qatar**

BUREAU VERITAS SURVEYOR AT DOHA 64 PARIS 1828 QATAR

Certificate of Compliance

This certificate is issued for the following:

Polyethylene (PE) Pipe and Fittings for Underground Fire Protection Service
(see details attached)

Prepared for:

Advanced Plastic Factory
Street No 7, PO Box 15756
New Industrial City, Doha 15756
Qatar

Manufactured by:

Advanced Plastic Factory
Street No 7, PO Box 15756
New Industrial City, Doha 15756
Qatar

FM Approvals Class: 1613 (February 2017)

Approval Identification: PR453285

Date Approved: June 22, 2021

To verify the availability of the Approved product, please refer to www.approvalguide.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

David B. Fuller
VP, Manager of Fire Protection
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062 USA

Certificate of Compliance

Advanced Plastic Factory, Polyethylene Pipe and Fittings

Product Designation	*Nominal Pipe Size, mm.*	*Pressure Rating, bar (psi)*	*Remarks*
SDR11 Pipe	63, 75, 90, 110, 125, 140, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450, 500	13.25 (192)	a
SDR9 Pipe	63, 75, 90, 110, 125, 140, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450, 500	17.25 (250)	a
SDR11 90 Deg. Elbow (4 segment)	90, 110, 125, 140, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450, 500	13.25 (192)	a
SDR9 90 Deg. Elbow (4 segment)	90, 110, 125, 140, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450, 500	17.25 (250)	a
SDR11 45 Deg. Elbow (3 segment)	90, 110, 125, 140, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450, 500	13.25 (192)	a
SDR9 45 Deg. Elbow (3 segment)	90, 110, 125, 140, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450, 500	17.25 (250)	a
SDR11 Reducer	110x90, 140x125, 160x110, 200x160, 250x200, 315x250, 355x315, 400x355, 450x400	13.25 (192)	a
SDR9 Reducer	110x90, 140x125, 160x110, 200x160, 250x200, 315x250, 355x315, 400x355, 450x400	17.25 (250)	a
SDR11 Equal Tee	90, 110, 125, 140, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450, 500	13.25 (192)	a
SDR9 Equal Tee	90, 110, 125, 140, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450, 500	17.25 (250)	a
SDR11 End Cap	110, 160, 200, 250	13.25 (192)	a
SDR9 End Cap	110, 160, 200, 250	17.25 (250)	a
SDR11 Stub End	110, 160, 200, 250	13.25 (192)	a
SDR9 Stub End	110, 160, 200, 250	17.25 (250)	a

Remarks:

a. Pipe and fittings may be directly connected together by the butt fusion process. Manufacturer fusion instructions must be strictly followed for a proper fusion joint. The pipe and fittings may also be joined to other FM Approved steel flanged pipe and fittings by using FM Approved flange adapters.

Kitemark™ Certificate

This is to certify that:

Advanced Plastic Factory WLL
New Industrial Area Zone 81
Street 2, Building 156
PO Box 16150
Doha
Qatar

Holds Certificate Number: KM 704588

In respect of:

ISO 4437-2 (BS EN 1555-2)
Plastic piping systems for the supply of gaseous fuels Polyethylene (PE)

This issues the right and licence to use the Kitemark in accordance with the Kitemark Terms and Conditions governing the use of the Kitemark, as may be updated from time to time by BSI Assurance UK Ltd (the "Conditions"). All defined terms in this Certificate shall have the same meaning as in the Conditions.

The use of the Kitemark is authorized in respect of the Product(s) detailed on this Certificate provided at or from the above address.

For and on behalf of BSI: Chris Lewis - Certification Director, Product Certification

First Issued: 2020-01-17
Latest Issue: 2020-07-07

Effective Date: 2020-07-07
Expiry Date: 2023-01-16

...making excellence a habit.™

Kitemark™ Certificate

No. KM 704588

BS ISO 4437-2:2014 Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) Part 2: Pipes

BS EN 1555-2:2010 Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) Part 2: Pipes

This Kitemark certificate covers the following range of PE100 pipe, sizes from 20mm to 500mm (SDR9) and 20mm to 630mm (SDR11):

Description	Outside diameter		Wall thickness		MOP	Core material	Stripe material
	SDR9	SDR11	SDR9	SDR11			
PE100 pipe **- Black with Yellow stripe** **OR** **- Black with Orange stripe**	20mm 25mm 32mm 40mm 50mm 63mm 75mm 90mm 110mm 125mm 140mm 160mm 180mm 200mm 225mm 250mm 280mm 315mm 355mm 400mm 450mm 500mm	20mm 25mm 32mm 40mm 50mm 63mm 75mm 90mm 110mm 125mm 140mm 160mm 180mm 200mm 225mm 250mm 280mm 315mm 355mm 400mm 450mm 500mm 560mm 630mm	3.0mm 3.0mm 3.6mm 4.5mm 5.6mm 7.1mm 8.4mm 10.1mm 12.3mm 14.0mm 15.7mm 17.9mm 20.1mm 22.4mm 25.2mm 27.9mm 31.3mm 35.2mm 39.7mm 44.7mm 50.3mm 55.8mm	3.0mm 3.0mm 3.0mm 3.7mm 4.6mm 5.8mm 6.8mm 8.2mm 10.0mm 11.4mm 12.7mm 14.6mm 16.4mm 18.2mm 20.5mm 22.7mm 25.4mm 28.6mm 32.2mm 36.4mm 40.9mm 45.5mm 50.9mm 57.3mm	SDR9: 12.5 bar SDR11: 10.0 bar	PE100 Black compound: POLIMAXX IRPC P901BK (Thailand) OR FORMOSA TAISOX 8001BL (Taiwan)	PE100 Natural compound: FORMOSA TAISOX 8001 (Taiwan) --------- Masterbatch: ColorPlas Polyadditives LLP Yellow CPF-100128 OR Orange CPA-100130

The MOP is based on the minimum required stength (MRS) of 10 MPa and a design coefficient of 2.0.

Note: This certificate supercedes that dated 17th January 2020 and covers the addition of the 400mm size.

Manufacturing location:
Advanced Plastic Factory WLL
New Industrial Area Zone 81
Street 2, Building 156
PO Box 16150
Doha
Qatar

First Issued: 2020-01-17
Latest Issue: 2020-07-07

Effective Date: 2020-07-07
Expiry Date: 2023-01-16

Approval Number 2202551
Test Report: J-00399476

Water Regulations Approval Scheme Ltd.
Unit 13,
Willow Road,
Pen y Fan Industrial Estate,
Crumlin,
Gwent,
NP11 4EG

7th March 2022

Advanced Plastic Factory
New Industrial Area - Street No. 02,
Building 156,
Zone 81,
PO Box 16150,
Doha
Qatar

WATER REGULATIONS APPROVAL SCHEME LTD. (WRAS)
MATERIAL APPROVAL

The material referred to in this letter is suitable for contact with wholesome water for domestic purposes having met the requirements of BS6920-1:2000 and/or 2014 'Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water'.

The reference relates solely to its effect on the quality of the water with which it may come into contact and does not signify the approval of its mechanical or physical properties for any use.

POLYETHYLENE- COMPONENTS. **5240**

'HDPE 100 Black POLIMAXX P901BK'. Black coloured, extruded HDPE pipe. For use with water up to 65°C.

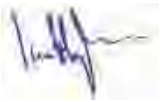
APPROVAL NUMBER: 2202551
APPROVAL HOLDER: ADVANCED PLASTIC FACTORY

The Scheme reserves the right to review approval.
Approval 2202551 is valid between February 2022 and February 2027

An entry, as above, will accordingly be included in the Water Fittings Directory on-line under the section headed, “Materials which have passed full tests of effect on water quality”.

The Directory may be found at: www.wrasapprovals.co.uk/approvals-directory/

Yours Faithfully



Ian Hughes
WRAS Approvals Manager

WRAS MATERIAL APPROVAL - MATERIALS WHICH HAVE PASSED FULL TESTS OF EFFECT ON WATER QUALITY

The material referred to in this letter is suitable for contact with water for domestic purposes. **Approval of this material does not signify the approval of its mechanical or physical properties for any use.**

Manufacturers or applicants may only quote in their sales literature terms which are used in this letter, namely that; 'the material as listed, having passed the tests of effect on water quality, is suitable for use in contact with wholesome water'

This may be abbreviated to 'Water Regulations Approval Scheme - Approved Material' or 'WRAS Approved Material'.

The scope of an Approval does not extend to rebranded materials unless otherwise agreed by the Scheme.

Use of the WRAS Approved Material Logo

Approval holders may use the WRAS Approved Material logo and make reference to any approval issued by WRAS Ltd. in respect of a particular material or range of materials provided the approval is, and remains valid.

Approval holders are entitled to use the logo on the packing, promotional literature and point of sale advertising Approved Materials.

Modifications to existing Approvals

It is a condition of WRAS Material Approval that NO changes or modifications to the Approved Material, be made without the Approval Holder first notifying WRAS Ltd. Full details of the proposed changes must be provided to the Scheme. Failure to comply with this condition will immediately invalidate a previously granted Approval.

Re-Approval

WRAS will write to you 1 year before the approval expires asking whether you would like to renew it. Please complete the relevant section of the MA3 application form which will be included with the letter and return to WRAS (via e-mail or post).

Please note it is the responsibility of the Approval Holder to ensure the Approval remains valid. WRAS Ltd. accepts no liability for the delay in granting approval where this is caused by circumstances outside of the Scheme's control.

Approval Number 2202552
Test Report: J-00399477

Water Regulations Approval Scheme Ltd.
Unit 13,
Willow Road,
Pen y Fan Industrial Estate,
Crumlin,
Gwent,
NP11 4EG

7th March 2022

Advanced Plastic Factory
New Industrial Area - Street No. 02,
Building 156,
Zone 81,
PO Box 16150,
Doha
Qatar

WATER REGULATIONS APPROVAL SCHEME LTD. (WRAS)
MATERIAL APPROVAL

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POLYETHYLENE- COMPONENTS. **5240**

'HDPE 100 Blue POLIMAXX P901BL'. Blue coloured, extruded HDPE pipe. For use with water up to 65°C.

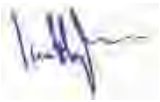
APPROVAL NUMBER: 2202552
APPROVAL HOLDER: ADVANCED PLASTIC FACTORY

The Scheme reserves the right to review approval.
Approval 2202552 is valid between February 2022 and February 2027

An entry, as above, will accordingly be included in the Water Fittings Directory on-line under the section headed, “Materials which have passed full tests of effect on water quality”.

The Directory may be found at: www.wrasapprovals.co.uk/approvals-directory/

Yours Faithfully



Ian Hughes
WRAS Approvals Manager

WRAS MATERIAL APPROVAL - MATERIALS WHICH HAVE PASSED FULL TESTS OF EFFECT ON WATER QUALITY

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Please note it is the responsibility of the Approval Holder to ensure the Approval remains valid. WRAS Ltd. accepts no liability for the delay in granting approval where this is caused by circumstances outside of the Scheme's control.

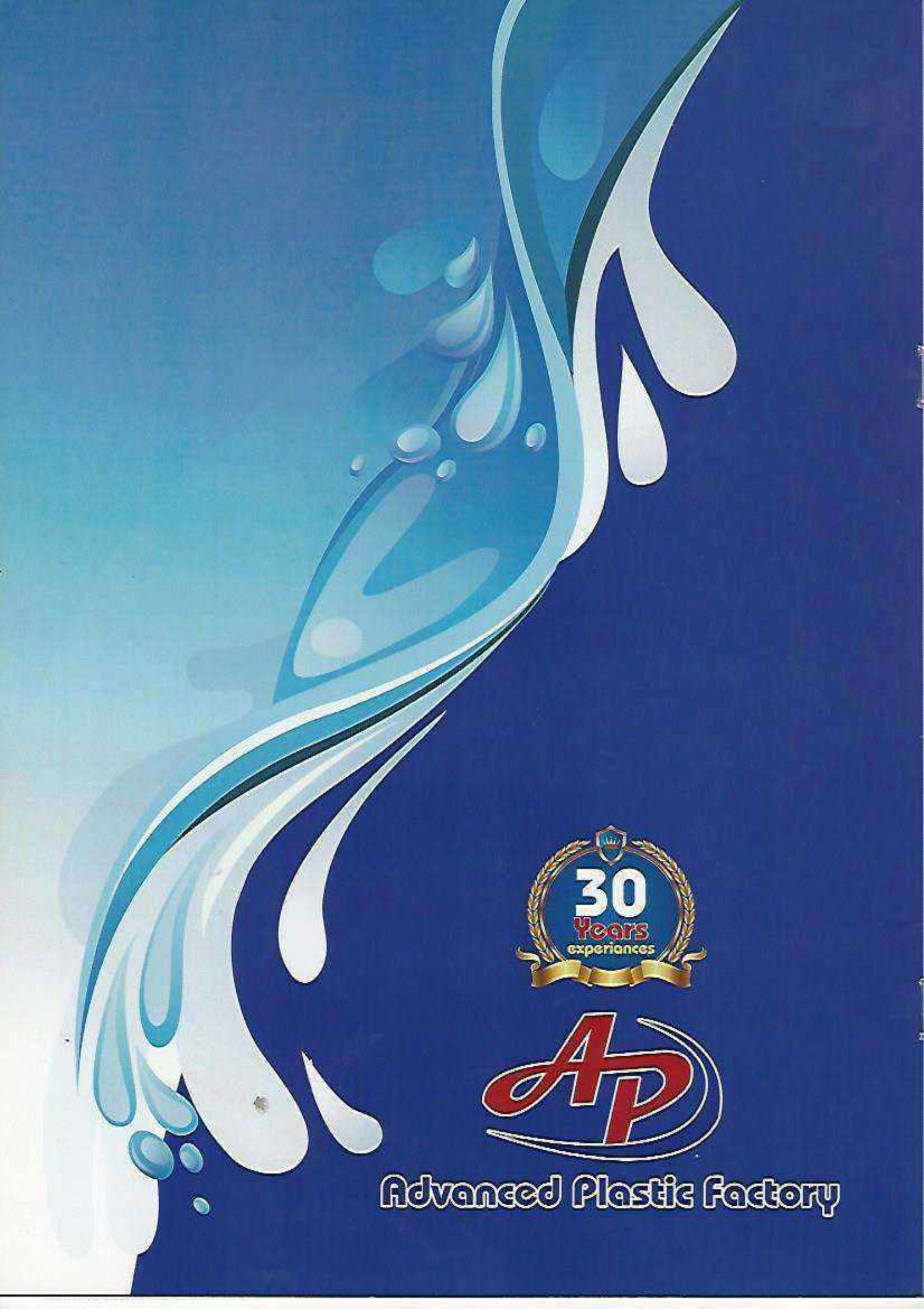
30 Years experiances

مصنع المتقدمة للبلاستيك

Advanced Plastic Factory

for plastic pipes u P.V.C , H.D.P.E and P.P.R pipes

فخر الصناعة القطرية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Years
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