
PLAST
Arkan

PVC

Arkan PLAST

INTRODUCTION

More than 25 years of experience in the field of plastic manufacturing, we have been able to build a good reputation and confidence for Arkan plast, which makes us proud in front of all our clients in different markets. That was a great motivation to us to set up Arkan factory that has been created to keep up with the last updates reached by plastic pipe technology and its accessories
that are made from pvc and ppr material. The company manufactures PVC pipes for all purposes, pressure pipes for transporting the drinking water and sanitation, drainage pipes and irrigation pipes, and telephone and electric cables. The diameters of which start from 20 mm till 400 mm.

Arkan Pipes are Produced according to the following specification:

German specification for drinking water and irrigation DIN8026-8061
American specification ASTM D -2241 SDR SERies
American specification ATM D - 1785 SCH40 - SCH80.
British specification BS 3505

Arkan Pipes Features:

- Durability and shock, acid and alkali resistance
- Rust and corrosion resistance
- Ease of installation and maintenance
- High electricity insulation ability
- Not to influence color or taste or smell of the transported fluid
- High efficiency for fluid transfer due to the smoothness of the inner surface and low coefficient for friction and lack of formation of sediment in the inner surface.
- U.P.V.C Pipes are considered as the most suitable types of pipes for use in highly aggressive soils because of its high resistance to soil salts of high concentration.
- They do not have a bad effect on the health, and they are resistant to bacteria and rodents.
- Arkan pipes are characterized by accurate follow up for all stages of production and stability and measurements based on pipe height, and the shape and dimensions of the head match the technical specification.

INDEX *Pages*

Our Services

Customer Care

We support our customers in making cost effective and correct use of our pipes and fittings range. This involves assistance in planning installation, training, troubleshooting, maintenance, upgrading, and product disposal. Our sales and service representatives' basic goal is not only satisfy our customers, but to offer them an experience that exceeds their expectations. We aim to extend our automated customer services through our internet website, providing service 24-hours a day. Whatever the situation may be, our call center staff make sure that they don't leave our customers with unanswered questions.

Customer and partner Training

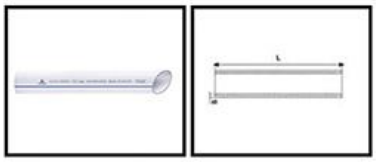
Train your customer better – and your result will be better. We increase customer satisfaction and product awareness and knowledge through training services to our customers. Customers who get full utility out of the products and services they have purchased are simply more likely to repeat purchases and refer others. Providing education and in formation on our pipes and fittings simplifies a customer's decision-making process on what solution to best fit their needs this improves our product adoption and effectively reflects on our increased sales.

Quality Assurance

The production of a quality controlled pipe system demands supervision, regulation and control on all work operations. We follow DIN-guidelines, to maintain minimum requirements for internal control, through internal audits and laboratory tests.

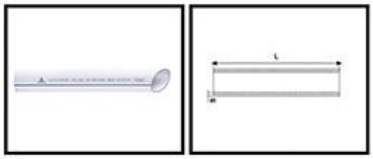
Drainage Solutions
Products Details

Pipes



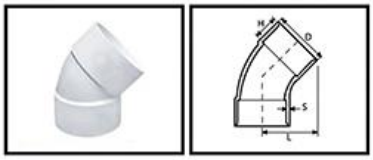
	Dn	L(m)	S(mm)	Kg/m
	48	6	2.5	0.582
	48	6	3.7	0.819
Export	50	6	2.5	0.618
Export	50	6	3.7	0.871
	60	6	2.7	0.796
	60	6	3.9	1.109
Export	63	6	1.9	0.608
Export	63	6	3	0.919
	75	6	3	1.103
	75	6	4	1.414
	75	6	5	1.724
Export	90	6	3	1.333
	110	6	2.8	1.542
	110	6	3	1.623
	110	6	4	2.111
	110	6	5	2.567
	160	6	4	3.130
	160	6	5	3.909

Multi-Layer Pipes



Dn	L	S	Kg/m
75	6	3	1.067
75	6	4	1.381
110	6	3	1.61
110	6	4	2.114
110	6	5	2.575
160	6	4	3.034
160	6	5	3.733

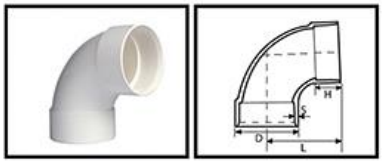
Elbow 45°



B=45 degree

	Dn	L(m)	H(mm)	S(mm)	Kg
	48	50	30	4	0.080
Export	50	52	33	4	0.070
	60	61	35	4	0.110
Export	63	60	32	4	0.115
	75	70	40	4	0.180
Export	90	81	42	4.5	0.235
	110	93	45	5.5	0.390
	160	140	70	6	0.921

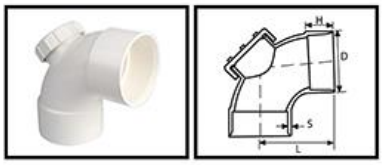
Elbow 87.5°



B=87.5 degree

	Dn	L(m)	H(mm)	S(mm)	Kg
	48	72	30	4	0.110
Export	50	83	33	4	0.100
	60	92	35	4	0.180
Export	63	105	32	4	0.143
	75	109	40	4	0.290
Export	90	143.5	42	4.5	0.313
	110	147	45	6	0.680
	160	208	70	6	1.490

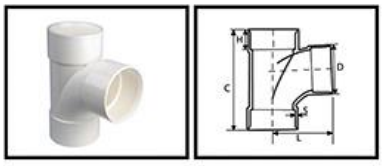
Elbow 87.5° with access



B=87.5 degree

Dn	L	H	S	Door	Kg
60	91	85	4	75	0.242
75	109	40	4.5	75	0.355
110	145	45	6	110	0.676
160	209	70	6	110	1.490

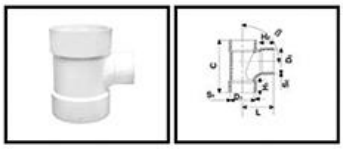
Tee 87.5°



B=87.5 degree

	Dn	L	H	S	C	Kg
	48	71	30	4	127	0.150
Export	50	78	32	4	140	0.140
	60	86	35	4	153	0.226
Export	63	71	32	4	139	0.200
	75	100	40	4.5	189	0.365
Export	90	95	42	4.5	187.5	0.425
	110	142	45	6	243	0.933
	160	346	70	6	345	1.885

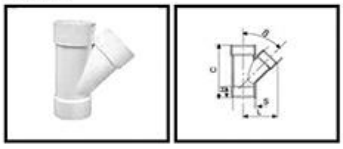
Tee 87.5° /Reducer



B=87.5 degree

D1	D2	H1	H2	C	L	S1	S2	Kg
75	60	40	34	167	96	4.5	4	0.300
110	50	46	33	200	103	6	5.5	0.670
110	60	45	36	180	105	6	4.5	0.632
110	75	45	40	196	121	6	4	0.680
160	110	71	45	288	169	6	6	1.420

Tee 45°



B=45 degree

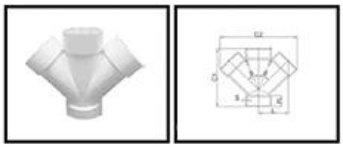
	Dn	L	H	S	C	Kg
	48	86	30	4	142	0.170
Export	50	95	32	4	153	0.150
	60	103	35	4	165	0.279
Export	63	112	33.6	4	177.5	0.275
	75	128	40	4.5	202	0.414
Export	90	153	43.7	4.5	238	0.600
	110	182	45	6	281	1.100
	160	250	71	6	390	2.565

Tee 45°/Reducer

B=45 degree

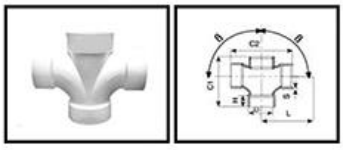
	D1	D2	H1	H2	C	L	S1	S2	Kg
Export	50	110	47	36	240	132	5.5	4	0.680
	60	110	45	37	222	140	6	4	0.740
	75	110	46	40	260	155	6	5	0.910
	160	110	71	45	320	230	6	6	1.920

Cross 110/45°



Dn	L	H	S	C1	C2	Kg
110	145	51.3	6.5	281	367.8	1.560

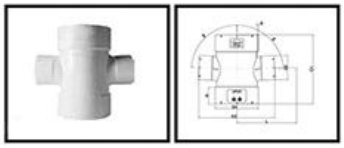
Cross 87.5°



B=87.5 degree

Dn	L	H	S	C1	C2	Kg
75	104	46	4.5	189	207	0.500
110	145	45	6.5	293	245	1.326

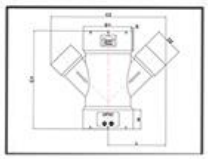
Cross 87.5° /Reducer



B=87.5 degree

	D1	D2	L	H	S	C1	C2	Kg
Export	110	50	107	47	5.5	200	214	0.720
	110	60	105	47	5.5	200	214.5	0.730
	110	75	114	47	5.5	200	255	0.875

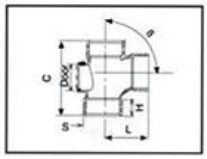
Cross 45°/Reducer

B=87.5 degree

	D1	D2	L	H	S	C1	C2	Kg
Export	110	50	112	47	5.5	240	265	0.755
	110	60	115.5	47	5.5	240	279	0.805
	110	75	126	47	5.5	240	312	0.890

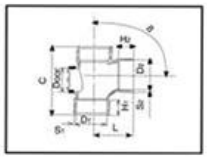
Tee 87.5° with access door

B=87.5degree

Dn	L	H	S	C	Kg
60	86	36	145	4	0.301
75	100	40	189	4.5	0.441
110	141	45	242	6	0.920
160	203	71	345	6	2.000

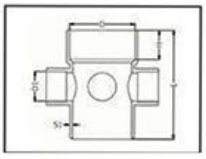
Tee 87.5° /Reducer with access door

B=45 degree

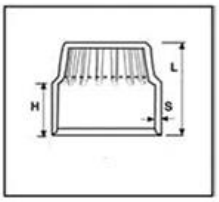
D1	D2	H1	H2	C	L	S1	S2	Kg
75	60	40	35	65	96	4.5	4	0.365
110	60	45	35	185	107	6	5	0.710
110	75	45	36	199	122	6	6	0.745
160	110	71	45	288	214	6	6	1.505

Drainage Collector

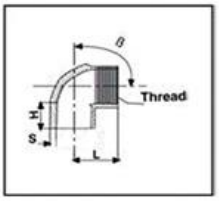
	Dn	D1	D2	L	H	S	C	Kg
Export	110	50	63	95.5	55	5	186.18	0.670
	110	48	48	95.5	55	5	186.18	0.660
	110	60	60	95.5	55	5	186.18	0.706

Air Vent



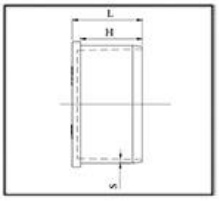
Dn	L	H	S	Kg
60	88	35	3	0.060
75	102	46	3	0.090
110	102	52	4	0.165

Elbow with inner thread 87.5°



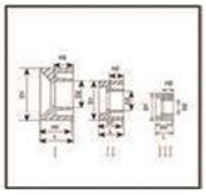
	Dn	Thread	H	S	C	Kg
	48	1.25"	30	4	59	0.120
	48	1.5"	30	4	58	0.110
Export	50	1.25"	30	4	58	0.110
Export	50	1.5"	30	4	58	0.100

Floor Drain Plug



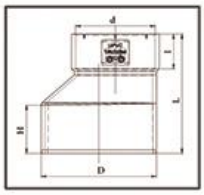
	Dn	L	H	S	Kg
	48	28	24	3	0.026
Export	**50**	28.5	25	3	0.030
	60	29	25	3.5	0.035
	63	35	30	5	0.04
	75	69	65	4.5	0.05
	110	111	40	3.5	0.140
	160	43	38	5	0.23

Reducing Bush



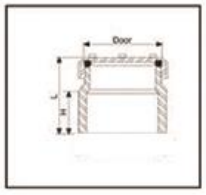
	Type	D1	D2	H1	H2	L	Kg
	III	48	32	31	29	38	0.039
	III	48	1"	31	29	38	0.035
	III	50	48	33	28	43	0.010
	III	60	48	36	30	45	0.060
	III	75	48	38	33	48	0.125
Export	II	75	50	40	36	50	0.110
	II	75	60	42	38	52	0.110
Export	II	110	50	46	38	58	0.250
	II	110	60	50	38	61	0.260
	I	110	75	50	38	61	0.266
	I	110	114	36	34	40	0.060
	I	160	110	65	56	77	0.533

Eccentric Reducer



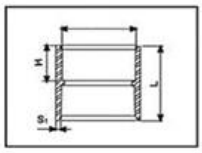
	D	d	H	I	L	Kg
Export	90	63	43.5	33	117	0.170
Export	90	75	43.5	38	117	0.180
	110	48	53	30	132	0.205
Export	110	50	54	38	132	0.235
	110	60	54	38	132	0.240
Export	110	63	54	38	132	0.245
	110	75	54	40	132	0.276
Export	110	90	54	45	132	0.278
	160	110	67	48	167	0500

Cleaning insert with access Door



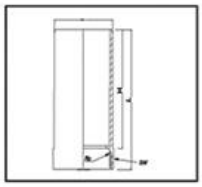
	Dn	L	H	S	Door	Kg
Export	50	72	38	3.6	65	0.098
	60	86	43	4	75	0.125
	63	65	40	3.6	75	0.113
	75	100	50	4.5	75	0.145
	90	82	43	4.5	75	0.166
	110	89	50	5	110	0.322
	160	125	78	6	110	0.607

Socket



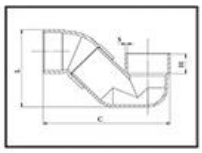
	Dn	L	H	S	Kg
	32	48	22	3	0.030
	1(Inch)	48	22	3	0.028
	48	65	31	4	0.060
Export	50	72	36	4	0.050
	60	80	40	4	0.090
Export	63	66.5	32	4	0.080
	75	94	45	4.5	0.150
Export	90	87	42	4.5	0.166
	110	109	52	5.5	0.330
	160	145.5	70	6	0.650

Socket with inner Thread



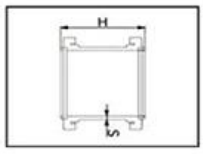
Dn	Thread	L	H	Kg
48	1.5"	100	85	0.076

Siphon



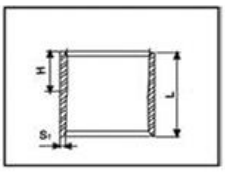
Dn	L	H	S	C	Kg
50	100	30	3	170	0.165
75	150	39	4.3	240	0.467
110	45	45	6	305	1.218

Repairing Socket With Expansion joint



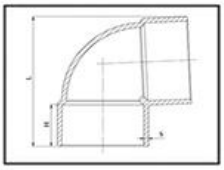
Dn	H	S	Kg
75	82	4	0.335
110	142	5	0.685
160	175	5	0.705

Repairing socket

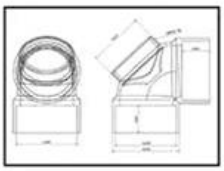
Dn	L	S	Kg
160	145.5	5	0.645

Short Elbow 87.5°

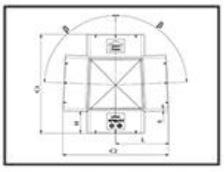
Dn	L	H	S	Kg
48	91	32	4	0.105
50	91	32	3	0.090
60	109	36	4	0.160
75	125	40	4	0.220
110	114	50	6	0.683

Short Elbow 87.5° with access door

Dn	L	H	S	Door	Kg
110	114	50	5.5	100	0.685

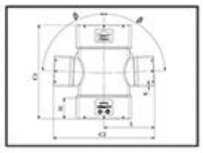
Short cross 87.5°

B=87.5 degree

Dn	L	H	S	C1	C2	Kg
60	71	35	4.2	139	142	0.250
63	71	35	2.7	139	142	0.195
90	95	42	4.5	187	190	0.500
110	112	48	5.7	216	225	0.870
160	158	68	6	305	316	1.860

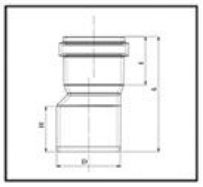
Short cross 87.5°/Reducer

B=87.5 degree

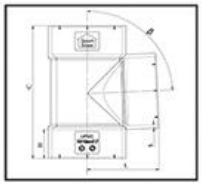
D1	D2	L	H	S	C1	C2	Kg
90	**63**	94.5	42	2.7	187	189	0.415
110	48	104	48	3.7	216	208	0.675
110	50	103	48	3.6	216	207	0.670
110	60	112	48	4.2	216	225	0.695
110	**63**	112	48	3.9	216	225	0.690
110	75	112.5	48	4.2	216	225	0.690
110	90	113	48	4.9	216	226	0.710

Eccentric reducer with gasket

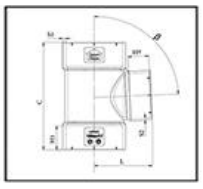
D	d	H	I	L	Kg
63	50	44	46	115	0.095
60	50	44	46	112	0.09

Short tee 87.5°

D	L	H	S	C	Kg
110	112	48	5.7	216	0.76

Short Tee 87.5°/Reducer

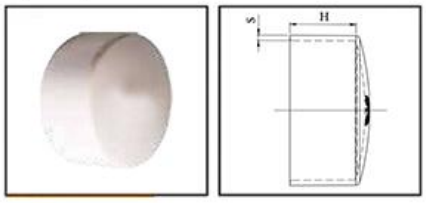



Dn1	Dn2	H1	H2	C	L	S1	S2	Kg
110	48	48	32	216	104	5.7	3.7	0.675
110	50	48	30	216	103	5.7	3.6	0.67
110	60	48	36	216	112	5.7	4.2	0.695
110	**63**	48	36	216	112	5.7	3.9	0.69
110	75	48	40	216	112.5	5.7	4.2	0.69
110	90	48	42	216	113	5.7	4.5	0.71

Expansion Joint

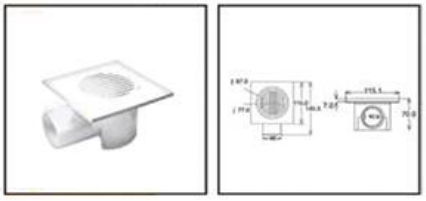
L	D1	D2	S	Kg
30	75	85	4	0.090
30	110	122.5	4	0.180
38	161	180	7.5	0.323

Pipe Plug



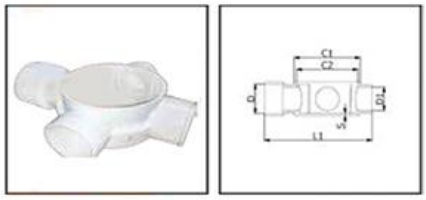
Dn	H	S	kG
1"	21.5	2.3	0.013
32	21.5	2.3	0.01
50	26	2.3	0.022
75	35.5	3	0.05
160	51.5	3	0.195

Small drain



L1	L2	L3	D	D1	D2	D3	X	S	Kg
84	145	115	48	87	77	40	115	7	0.230

Drain 7 cm

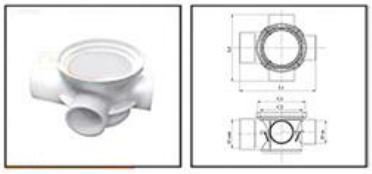


Measurements in mm.							
D in	D out	C1	C2	L1	L2	S2	Kg
48	60	117	110	200	175	5	0.370

Drain 8.8 cm

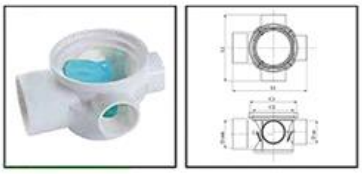
D in	D out	C1	C2	L1	S	Kg
75	60	111.5	108	220	4.5	0.475

Floor drain



	D in	D out	C1	C2	L1	L2	S2	Kg
	48	75	125	110	193	170	4	0.450
	48	60	125	110	180	170	4	0.425
	60	75	125	110	193	180	4	0.470
	60	60	125	110	193	180	4	0.465
Export	50	75	125	110	220	180	4	0.430
	48/60	75	130	120	197	185	4	0.570
	50	60	125	110	195	180	4	0.400
	110	110	201	200	280	280	5	1.500
	110	160	170	160	240	240	5	0.800

Floor drain with Oder trap

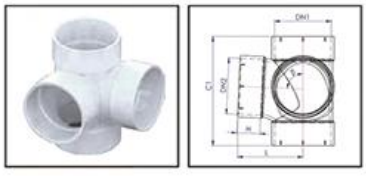


D in	D out	C1	C2	L1	L2	S	Kg
48	60	125	110	191	60	4	054
48	75	125	110	196	180	4	0.575
60	60	125	110	195	170	4	0.570
60	75	125	110	200	180	4	0.700
63	90	125	110	211	180	3	0.545

Open cover

	L	A	B	Kg
Closed	192	56	182	0.280
Open	192	56	182	0.270

Side cross



Dn1/Dn2	B	C1	C2	C3	S	H	L	Kg
110	87.5°	216	188	188	5.6	45	127	0.935

Angle valve ½" X ½"

washing machine valve ¾" X ½"

PVC pipes clamps

Measurements in mm.						
Pipe Size	**Thickness**	**Width**	**Hexagon Welding nut**	**Hex Head Bolt**	**Fisher Bolt**	**Fisher**
60	2.5	20	M8	6*30	8*80	S10
75	2.5	30	M10	6*30	10*100	S12
110	3	30	M10	6*30	10*100	S12

FEATURES

Products Information

ARKAN PVC-U underground and sewage piping system is one of the most comprehensive on the market with a full range from 48mm to 160mm in diameter.

Arkan was a pioneer in the development and marketing of PVC-U systems for this application and is well known for its excellent product quality.

The advantages of the **ARKAN** pipes are well accepted, they are lightweight, resistant to a wide variety of chemicals, do not support combustion, they are not subject to electrolytic corrosion. The fittings are designed with a high impact strength, which helps prevent damage during handling and installation. All parts assemble easily using solvent cement to accommodate thermal or ground movement. Pipes and fittings are manufactured according to ES 1717,1SO 4435, DIN 19534, DIN EN 1401, DIN EN 1329, DIN 80618062/, ISO 3633, ASTM 1)3311, and ASTM D2665 standards suitable for use below ground for general municipal drainage. All products comply with or exceed relevant International standards to ensure reliability and long-lasting service.

Arkan System Information

Material	Poly Vinyl Chloride - Un-Plasticized
Size	48mm - 160 mm
Area of application	Waste water pipes in buildings and laid above and underground inside and outside the building structure Water Management systems Ducting systems
Jointing	PVC Solvent Cement
Color	Pipe:- White by two blue stripes Fittings:- White
Installation temperature	Up to 60°C
Installation location	Indoors ,Outdoors and below ground

Scope of Application

Arkan pipes and fittings are mainly used for Non- pressure drainage lines resistant to hot water for domestic and industrial.

In single and multiple family house construction
In apartment construction
In renovation construction
In industrial plants
In large scale kitchens and laundries
In schools, universities
In hotels, convalescent homes
In infirmaries and many others

Inside these buildings the Arkan system can be used for:

Individual and collective lines
Downpipes
Ventilation pipes
Interior rain water pipes
Pipes for central dust extraction systems
Pipes, fittings and sealing elements are also suitable for the transportation of chemically aggressive
Electric and telecommunication cables ducts
Air conditioning drainage system

Chemical Resistance
INTRODUCTION
The Five tables in this document summarize the data given in a number of unplasticized poly vinyl chloride chemical resistance tables at present in use in various, derived from both practical experience and test results.
Table 1 contains an evaluation of the chemical resistance to a number of fluids judged to be either aggressive or not towards unplasticized polyvinyl chloride.
This evaluation is based on values obtained by immersion of unplasticized polyvinyl chloride test specimens in the fluid concerned at 20^0C and $60\ ^0$C and atmospheric pressure, followed in certain cases by the deamination of tensile characteristics.
Table 2, 3, 4 and 5 list these fluids as to whether or not unplasticized polyvinyl chloride pipe suitable for use in contact with them.
A subsequent classification will be established with respect to a restricted number of fluids deemed to be technically or commercially more important using equipment which permits testing under pressure and the determination of the "coefficient or chemical resistance" for each fluid. These tests will thus furnish more complete indication on the use of unplasticized polyvinyl chloride pipes for the transport of stated fluids, including their use under pressure.
1 SCOPE AND FIELD OF APPLICATION
This document establishes a provisional classification of the chemical resistance of unplasicized.
polyvinyl chloride with respect to about 160 fluids. It is intended to provide gen-eral guidelines on the possible utilization of unplasticized
polyvinyl chloride piping for the conveyance of fluids.
At temperature up to 20^0C and 60^0C,
In the absence of internal and external mechanical stress (for example, flexural stresses due to thrust, rolling loads).

Features

ISO /TR7473-1981(E)
2- DEFINITIONS, SYMBOLS AND ABREVIATIONS
The criteria of classification, definitions, symbols, and abreviations adopted in this document are as follows
S = Satisfactory
The chemical resistance of unpasteurized polyvinyl chloride exposed to the action of a fluid is classified as "satisfactory" when the results of tests are acknowledged to be "satisfactory" by the majority of the countries participating in the evaluation.
L = Limited
The chemical resistance of unpasteurized polyvinyl chloride exposed to the action of a fluid is classified as "limited" when the results of tests are acknowledged to be limited" by the majority of the countries participating in the evaluation.
Also classified as "limited" are the resistances to the action of chemical fluids for which judgments'' and 'NS' or "S" and " L" are pronounced to an equal extent.
NS = Not Satisfactory
The chemical resistance of unpasteurized polyvinyl chloride exposed to the action of a fluid is classified as "not satisfactory" when the results of tests are acknowl- edged to be "not satisfactory" by the majority of the countries participating in the evaluation.
Also classified as " not satisfactory" are the resistances to the action of chemical fluids for which judgments "L" and "NS" are pronounced to an equal extent.
Sat. sol.= Saturated aqueous solution, prepared at 20^0C.
Sol.= Aqueous solution at a concentration higher than 10%, but not saturated.
Dil. sol.= Dilute aqueous solution, at a concentration equal to or lower than 10 %.
Work. sol.= Aqueous solution having the usual concentration for industrial use.
Solution concentrations reported in the text are expressed as a percentage by mass.
The aqueous solutions of sparingly soluble chemicals are considered, as far as chemical action towards unpasteuri7ed polyvinyl chloride is concerned, as saturated solutions.
In table l, the resistance properties (S, L, NS) are reported on the right side of each fluid, but the same properties are to be
In general in this document, common chemical names are used.
For the definition of unpasteuri7ed polyvinyl chloride, see ISO 472, Plastics – Vocabulary.
The symbol for polyvinyl chloride, PVC, gin = ven in ISO 1043, Plastics - Symbols, IS used in the table headings.

Keywords

Keys:
+ = resistant
o = practically resistant
o = partially resistant
o = not very resistant
-- = not resistant

No:
Details = not tested
Any = any concentration
conc. = concentrated solution
low =low concentration
serv = service concentration
stand = standard, customary
disc. = discoloured
aq = aqueous solution
sat. = cold saturated
b.p. = boiling point

Features

ISO /TR7473 -1981(E)

TABLE 1 Chemical resistance of u unplasticized PVC, not subjected to mechanical stress, to various fluids at 20°C and 60°C.

Chemical or product	Conc.%	20°c	60°c
Acetaldehyde	40 %	NS	-
Acetaldehyde	100 %	NS	-
Acetic acid	Glacial	NS	NS
Acetic acid	25 %	S	L
Acetic acid	60 %	S	L
Acetic anhydride	100 %	NS	NS
Acetone	100 %	NS	NS
Adipic acid	Sat. sol.	S	L
Allyl alcohol	96 %	L	NS
Aluminum chloride	Sat. sol.	S	S
Aluminum potassium sulphate	Sat. sol.	S	S
Aluminum sulphate	Sat. sol.	S	S
Ammonia, dry gas	100 %	S	S
Ammonia, liquid	100 %	L	NS
Ammonia, aqueous	Dil, sol.	S	L
Ammonium chloride	Sat. sol.	S	S
Ammonium fluoride	20 %	S	L
Ammonium nitrate	Sat. sol.	S	S
Ammonium sulphate	Sat. sol.	S	S
Amyl acetate [1 -Pentanol acetate)	100 %	NS	NS
Amyl alcohol t I-Pentancll	100 %	S	L
Aniline	100 %	NS	NS
Aniline	Sat. sol.	NS	NS
Aniline hydrochloride	Sat. sol.	NS	NS
Antimony { Ill } chloride	90 %	S	S
Anthraquinone sulphonic acid	sol.	S	L
Arsenic acid	Dil, sol.	S	-
Arsenic acid	Sat. sol.	S	L
Beer	-	S	S
Benzaldehyde	0.1 %	NS	NS
Benzene	100 %	NS	NS
Benzoic acid	Sat. sol.	L	NS
Borax	Sat. sol.	S	L
Boric acid	Dil, sol.	S	L
Bromic acid	10 %	S	-

ISO /TR7473 -1981(E)
TABLE 2 Chemical resistance of unplasticized PVC, not subjected to mechanical stress, to various fluids at 20°C and 60°C.

Chemical or product	Conc.%	20°c	60°c
Bromine, liquid	100 %	NS	NS
Butadiene	100 %	S	S
Butane, gas	100 %	s	--
Butanols	Up to 100 %	s	L
Butyl acetate	100 %	NS	NS
Butyl phenol	100 %	NS	NS
Butyric acid	20%	S	
Butyric acid	98%	NS	NS
Calcium chloride	Sat. sol.	s	s
Calcium nitrate	50%	S	s
Carbon dioxide [aqueous solution]	Sat. sol.	s	L
Carbon dioxide, dry gas	100 %	s	s
Carbon dioxide, wet gas	--	S	s
Carbon disulphide	100%	NS	NS
Carbon tetrachloride	100 %	NS	NS
Chlorine, dry gas	100 %	L	NS
Chlorine, aqueous	Sat. sol.	L	NS
Chloroacetic acid	Sol.	s	L
Chlorosulphonic acid	100 %	L	NS
Chromic acid	From to 50%	S	L
Citric acid	Sat. sol.	S	S
Copper [1 I l chloride	Sat. sol.	S	S
Copper [l I l fluoride	2 %	S	S
Copper [l Il sulphate	Sat. sol.	S	S
Cresols	Sat. sol.	--	NS
Cresylic acid [mthyl bonzoic acid)	Sat. sol.	--	NS
Crotonaldehyde	100 %	NS	NS
Cyclohexanol	100 %	NS	NS
Cyclohexanone	100 %	NS	NS
Developers [photographic)	Work, sol.	S	s
Dextrin	Sat. sol	s	L
Dichloroethane	100 %	NS	NS
Dichloromethane	100 %	NS	NS
Diethyl ether	100 %	NS	-
Diglycolic acid	18%	s	L

ISO /TR7473 -1981(E)
TABLE 3 Chemical resistance of unplasticized PVC, not subjected to mechanical stress, to various fluids at 20°C and 60°C.

Chemical or product	Conc.%	20°c	60°c
Dimethylamine	30%	s	-
Ethanediol [Ethylene-glycol)	work, SOL.	s	s
Ethanol	95%	s	L
Ethyl acetate	100%	NS	NS
Ethyl acrylate	100%	NS	NS
Fluosilicic acid	32%	s	s
Formaldehyde	dlL. SOLV	s	L
Formaldehyde	40%	s	s
Formic acid	From 1% to	s	L
Furfuryl alcohol	100%	NS	NS
Gasoline (Aliphatic hydrcarbonsl	-	s	s
Glucose	Sat. sol.	s	L
Glycerol	100%	S	s
Glycolic acid	30%	s	s
Hexadecanol	100%	s	s
Hydrobromic acid	10%	s	L
Hydrobromic acid	50%	s	L
Hydrochloric acid	20%	s	L
Hydrochloric acid	Reather than 30 %	S	s
Hydrofluoric acid	40 %	L	NS
Hydrofluoric acid	60%	L	NS
Hydrofluoric acid, gas	100%	L	NS
Hydrogen	100%	s	s
Hydrogen peroxide	30%	s	s
Hydrogen sulphide, gas	100%	S	s
Iron { Ill } chloride	Sat. sol.	s	s
Lactic acid	10%	s	L
Lactic acid	From 1 0% to	L	NS
Lead acetate	90%	s	s
Lead acetate	Oil, sol,	s	s
Lead tetraethyl	Sat, sol.	S	-
Magnesium chloride	100%	s	s
Magnesium sulphate	Sat, sol.	s	s
Maleic acid	Sat, sol.	s	L
Methanol	Sat, sol.100%	s	L

ISO /TR7473 -1981(E)
TABLE 4 Chemical resistance of unplasticized PVC, not subjected to mechanical stress, to various fluids at 20^0C and 60^0C.

Chemical or product	Conc.%	200c	600c
Methyl methacryiate	100%	NS	NS
Milk	-	S	S
Molasses	Work, sol	S	-
Nickel sulphate	Sat. sol	S	L
Nicotinic acid	Work, sol.	S	NS
Nitric acid	Up to 45 %	S	NS
Nitric acid	From 50%to 98 %	NS	L
Oil and Fats	-	S	NS
Oleic acid	100%	S	S
Oleum	10%of so3	NS	S
Orthophosphosphoric acid,aqueous	30 %	S	L
Orthophosphosphoric acid, aqueous	Greater than 30 %	S	S
Oxalic acid	Dil, sol..	S	S
Oxalic acid	Sat, sol.	S	NS
Oxygen	100%	S	NS
Ozone	100%	S	NS
Perchloric acid	10%	S	NS
Perchloric acid	70%	L	NS
Petrol[Aliphatichydrocarbons/benzene]	80 / 20	NS	NS
Phenol	90%	NS	L
Phenylhydrazine	100%	NS	S
Phenylhydrazine hydrochloride	97%	NS	
Phosphine	100%	s	s
Phosphorus [111] chloride	100%	NS	s
Picric acid	Sat, sol.	s	NS
Potassium bromide	Sat, sol.	s	NS
Potassium chloride	Sat, sol.	s	NS
Potassium chromate	40 %	s	NS
Potassium cyanide	sol.	s	NS
Potassium dichromate	40%	s	s
Potassium hexacyanoferrate [I11]	Sat, sol.	s	L
Potassium hexacyanoferrate [111]	Sat, sol.	s	NS
Potassium hydroxide	sol.	s	NS
Potassium nitrate	Sat, sol.	s	-
Potassium permanganate	20%	s	L

ISO /TR7473 -1981(E)
TABLE 5 Chemical resistance of unplasticized PVC, not subjected to mechanical stress, to various fluids at 20°C and 60°C.

Chemical or product	Conc.%	20°c	60°c
Potassium persulphate	Sat. sol.	s	L
Propane, liquefied gas	100%	s	-
Pyridine	Up to 100 %	NS	-
Seawater	-	s	L
Silver nitrate	Sat. sol.	s	L
Soap	sol.	s	L
Sodium benzoate Sodium chlorate	35%	s	L
Sodium chloride	Sat. sol.	s	s
Sodium hexacyanoferrate [I I J Sodium hexacyanoferrate [I I	Sat. sol.	s	s
Sodium hydrogen sulphite	Sat. sol.	s	s
Sodium hydroxide	Sat. sol.	s	s
Sodium hypochlorite [1 3% of chlorine)	Sat. sol.	s	s
Sodium sulphite	sol.	s	s
Sugar { aqueous solution }	100%	s	L
Sulphur dioxide, dry	Sat. sol.	s	L
Sulphur dioxide, liquid	Sat. sol.	s	s
Sulphuric acid	100%	s	s
Sulphuric acid	100%	L	NS
Sulphurous acid	From 40% to 90%	S	L
Tannic acid	96%	L	NS
Tartaric acid	sol.	S	s
Tin (Il I chloride	sol.	S	s
Toluene	sol.	s	s
Trichloroethylene	Sat, sol.	s	s
Trimethylolpropane	100%	NS	NS
Urea	100%	NS	NS
Urine	Up to 10 %	s	L
Vinegar	10%	S	L
Vinyl acetate	-	s	L
Wine	Up to 80% g/ I of acetic acid	s	s
Xylol	100%	NS	NS
Silver nitrate	-	s	s
Soap	100%	Ns	NS
Maleic acid	sol.	s	L
Methanol	Sat, sol.	s	S

System Benefits
Dimensions and performance meet the requirement of Egypt, Germany, America and International standards.

Low Friction Loss
The smooth interior surfaces of Arkan system assure low friction loss and high flow rate. Additionally, since PVC-U resist rusting, pitting, scaling and corrosion, the high flow rate can be maintained for the life of the piping system.

Easy Installation
Arkan system is light in weight (approximately one-half the weight of aluminum and one-sixth the weight of steel) reducing transportation, handling, and installation cost. No special tools are required for cutting. These materials can be installed using the solvent cement joining technique.

Cost Effective
Longer pipe lengths, flexibility and the use of narrow trench widths significantly reduce installation costs, the major portion of the total in-site costs.

Non-Flammability
Arkan system does not support combustion.

Non-conductivity
Arkan system is a non-conductor of electricity, and is therefore not subject to galvanic or electrolytic action.

Effect on elevated temperatures
Arkan system is capable of handling typical waste water discharge temperatures up to approximately 60°C and is therefore satisfactory for use in soil and waste systems where continuous full-bore discharges of effluent are unlikely to exceed this figure.

Effect of low temperature
The impact strength of Arkan pipe and fittings decreases with reduction in temperature therefore increased care should be exercised if installations are carried in low temperature conditions.

Corrosion resistant
The inert nature of Arkan PVC-U pipe provides complete corrosion resistance, and renders wrapping, coating and lining unnecessary. This inert nature ensures that PVC-U sewer and drainage pipes have a long operational life.

Leakage elimination
Groundwater infiltration due to broken and cracked elements in the system, joint opening and ground movement are eliminated by the precision joints, flexible pipe barrel and sealed access points provided by the PVC-U sewer pipe and fittings system. Longer pipe lengths means fewer joints, further reducing possible sources of leaks, which research has shown to be directly proportional to the number of joints.
The solvent cement joint provided with the system eliminates the contamination of the groundwater and surface waters by sewer effluent with the resulting health hazards, visual pollution and public concern.

Low Thermal Conductivity
Arkan pipe have a much lower thermal conductivity factor than metal pipe. Therefore, fluids being piped maintain a more constant temperature. In many cases, pipe insulation is not required.

Expansion and contraction

Piping which is being laid in hot weather will be in an expanded condition and will subsequently contract on cooling. It must be remembered that every 6m length of PVC-U pipe will expand or contract approximately 5mm for every 10ºC rise or fall in temperature. Precautions against damage due to contraction can be taken by using ARKAN expansion joints.

Beneficial to Public Health

Arkan system is clean and safe, it is so safe that it is used for intravenous medical tubing, and it is the pipe of choice for ecologically sensitive environments like salt water aquariums

Best Choice for the Environment

Arkan system is one of the world's most sustainable products, making it ideal for long-term use in underground infrastructure. It requires less energy and fewer resources to manufacture than old-technology materials, and its production creates virtually no waste.
Moreover, it is produced with sustainable and abundant resources: chlorine, which is derived from salt, and domestically produced natural gas, which helps reduce consumption of imported oil.

Clean and Safe Manufacturing

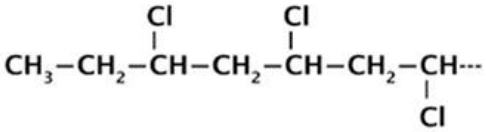
PVC-U pipe manufacturing is extremely efficient, with virtually100 % of the PVC compound being used. It takes four times less energy to make than concrete pipe, and half that used for iron pipe.

Non-Toxicity

PVC products are completely non-toxic in normal use, are suitable for use with food. It is a safe material and a socially valuable resource that has been used for more than half a century. It meets all international standards for safety and health for both the products and applications for which it is used.

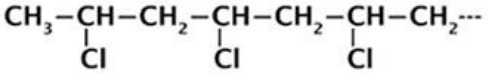
Poly Vinyl Chloride (PVC)

The structural formula of Poly Vinyl Chloride differs from that of plyethylene in that on every second carbon atom of the chain molecule a hydrogen atom is replaced by a chlorine atom.
These chlorine atom may either be arranged on both sides of the carbon atom (atactic).



or all the groups can be on only one side (isotactic). Commercial polypropylenes are exclusively
isotactic.

Its formula:



Poly Vinyl Chloride is polymerized by different methods; the most famous are suspension and
emulsion

Suspension poly Vinyl Chloride is used in Pipes and Fittings but must be mixed with some
additives (heat stabilizer , lubricants , color , etc ...).

Technical Specifications

Characteristic	Unit	Values
Physical Properties		
Density	kg/cm3	1.38
Water Absorption	mg/cm2	0.71
Mechanical Properties		
Modulus of Elasticity	N/mm2	3000
Compressive Strength	N/mm2	66
Flexural Strength	N/mm2	95
Tensile Strength	N/mm2	50
Impact Strength (Charpy)		No Break
Shore Hardness	R	115
Thermal Properties		
Vicat Softening Temperature	ºC	>82
Max. Operating Temperature	ºC	60
Longitudinal Reversion		< 2 %
Specific Heat	KJ/Kg.K	
Coefficient of Thermal Expansion	m/m.K	8×10^{-5}
Thermal Conductivity	W/m.K	0.16
Electrical Properties		
Volume Resistively	Ω.cm	$>10^{14}$
Surface Resistance	Ω	$2.4*10^{12}$
Dielectric Strength	Kv/mm	>40

System Design

Structural Design

Arkan range of PVC pipes are classified as "flexible" pipes, which means they have the ability to deform or deflect diametrically within specified limits without structural damage or impairing the performance of the pipes.

The external soil and live loadings imposed on flexible pipes may cause a decrease in the vertical diameter and an increase in the horizontal diameter of the pipe. The horizontal movement of the pipe walls in the soil material at the sides develops a passive resistance within the soil to support the external load. Hence, the pipeline performance is influenced by the soil type and density. The higher the effective soil modules at pipe depth, the less the pipe will deflect.

Important Design Principle

Pipe Sizes

The correct sized pipes should be used throughout the installation to ensure an efficient flow through the drainage system.

Gradient

Access

Access to a drainage system should be included wherever there is a change in direction. Venting

All drainage systems require a vent to allow fresh air to be taken into the system to ensure a smooth running to the discharge.

Expansion

It is important to allow for expansion in all plastic drainage system. Solvent weld systems should use expansion joints where required. Traps

Each appliance (Shower, Basin etc.) should have its own trap.

Connection to a floor gully provides an additional trap to prevent foul odors escaping into living space areas.

System Advantage

Arkan systems offer integrated solutions. This enables specifies and installers to assemble complete drainage, plumbing systems from a single source, with complete confidence in compatibility and performance. All systems are backed by comprehensive technical support and a nationwide distribution network to ensure availability when and where required.

Arkan characterized by the following features:

High quality product

Excellent fluid flow characteristics

Immunity to all types of corrosion

Good mechanical strength

High ring stiffness

Fast and easy installation

Light weight, ease of installation, ease of maintenance

Good electrical insulation properties

QUALITY ASSURANCE

System Standards
Arkan manufacturing according to the following standards:
ES 17172008/
Pipe and Fittings made of Unplasticized Poly (Vinyl Chloride) (PVC-U) for underground drainage and sewage system
DIN 80618062/
Unplasticized Poly (Vinyl Chloride) (PVC-U) Pipes
DIN EN-1401
Plastic piping system for non-pressure underground drainage and sewerage Unplasticized Poly Vinyl Chloride (PVC-U)
DIN 19534
Plastic piping system for non-pressure underground drainage and sewerage Unplasticized Poly Vinyl Chloride (PVC-U)
ISO 3633
Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings -- Unplasticized Poly (vinyl chloride) (PVC-U)
ASTM D 2665
Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D 3311
Standard Specification for Drain, Waste, and Vent (DWV) Plastic Fittings
DIN EN 1329
Poly (Vinyl Chloride) (PVC) Plastic Piping System for soil and waste discharge (low and high temperature within the building structure
ISO 4435
Plastics piping systems for non-pressure underground drainage and sewerage – Unplasticized poly (vinyl chloride) (PVC-U)
DIN 4102
Fire behavior of building materials and building components.

System Control
The production of Arkan superior high quality piping system calls for the regulation and control of all areas of the operations. All results are documented and archived:
Testing and accepting incoming goods.
Process Control.
In- process inspection.
Final inspection tests.
Regulation for the quality control of Arkan drainage system include all above standards that feature the minimum requirements for internal control.
Conformance to the superior quality standards is verified through independent authorities, by internal audits and Laboratory tests. Arkan quality standards are controlled by Egypt regulations.
ARKAN is a highly qualified and experienced manufacturer in extrusion and injection molding.
ARKAN is also the market leader and pioneer in the manufacturing of PVC-U drainage system in Egypt.
This is reflected in our internal quality standards and procedures, which are illustrated by the constant quality of our products.

Internal Control
A team of highly trained and qualified QC engineers, equipped with a state of art laboratory, ensure that all test are carried out in compliance with our quality control policies, which includes:
Testing all Raw Materials.
Measuring and inspecting our production equipment.
Auditing our production procedures.
A final inspection for the quality of our finished products.
All internal quality audits are documented and archived in accordance with the highest standard quality control; polices.

laboratory
laboratory serves one of the most important functions in our production and process control. A significant portion of the ARKAN regulations pertain to the quality control laboratory and product testing to be able producing the highest quality products.
ARKAN laboratory have the most advanced equipment made in Egypt with high technology.
ARKAN Laboratory Equipment: -
Hydrostatic Pressure Tester
Gardner Impact Tester
Falling Dart Impact Tester
Melt Flow Tester - Melt Flow Indexer - MFI
Specific Gravity Tester - Densimeter
Milling Machine
Thermo bath
Thermo oven
Laboratory Granulator
Apparent / Bulk Density Tester
Laboratory Mixer
Limiting Oxygen Index Chamber
Brittleness Point Temperature Tester
Moisture content apparatus
Differential Scanning Calorimeter
Sieve Analysis Tester

Testing and Accepting Incoming Goods
All incoming goods are carefully inspected, to insure that the raw material conforms to the set requirements. Goods that haven't been tested don't release for production.
The incoming raw materials are tested according to ISO 1133.

In-Process Inspection
The quality plan requires that all inspections are carried out at the beginning as well as during production. As production starts all relevant data are checked by the quality assurance department.
Pre-production samples are testes by the laboratory engineers and technicians for the following test:-
Surface finish
Dimensional accuracy
Check Marking
Date for extrusion and injection molding machines
The product is only released if optimal tests are achieved

Final Inspection

QC requires that inspections and tests are carried out on all finished products. The results are all documented. Finished products are only released to storage when all tests and inspections have conformed to authorized procedures and specifications. The final tests include a time lapse procedure. This measures the usability of the products in their fields of application, as well as removing production weaknesses. These inspections are the method for quality assurance during production and for design tests. The results document the system quality and serve to optimize the manufacturing process.
The final inspection covers the following main tests: -

Visual control
Aspect, roughness, opacity, conformity of color, chamfer, porosity, detect any trace of burning, clean cut, no irregularities, ... all those controls are performed without magnification, they allow to detect any eventual trouble in the manufacturing process at the closest points of the extrusion lines

Dimensional control
Outside diameter, wall thickness (8 points), overall length, (length, groove, etc...), out of roundness, mean outside diameter, measured with the adequate calibrated measuring instruments. This test carried out according to ES 1717 standard.

Impact resistance:
A calibrated weight from a specified height falls on the product a number of times, without any friction: passing the test demonstrates the impact resistance of the PVC product according to ES 1717 standard.

Methylene Chloride
Product is tested by immersion in methylene chloride, a very corrosive solvent, at 23°C during 20 minutes. Product tested should show no attack at any point of the pipe (internal, external, through the wall), proving that the fusion temperature has been reached. If this point is not reached, the filler used in the formulation for lubrication flows between the molecules to the surface, and proves that the polymerization is not complete, and thus: that the properties of PVC are not met. This ageing test reveals the imperfection of the product. A product is in compliance if the mix of temperature-pressure-speed is well tuned in order to reach the fusion point (very variable according to product, conditions, material, ...) but still not reaching the degradation stage (burning); because the measurement of the degree of fusion is very costly and almost impossible to obtain with the number of variables, the solvent test is a substitution considered as very accurate. This test carried out according to ES 1717 standard.

Longitudinal reversion:
A sample of the product is immersed in an oven during 30 minutes at 150 °C: all tensions are released at this temperature considered as the beginning of fusion. The product is then cooled at ambient temperature, and the deformation measured (shrinkage acceptable if smaller than 5%. This test helps to identify some processing abnormalities that might affect the pipe dimensions at long term, by evaluating the effect of heating on the pipe. This test carried out according to EN 743 standard.

Specific gravity
It allows verifying that the PVC content complies with the requirements of the DIN 1401 standard (at least 80% by mass for pipe, and more than 85% for fittings), failing which the pipe will not withstand long term operation (50 years). This test allows demonstrating that the filler content does not exceed a reasonable percentage of the mixture.

Internal Pressure
Internal pressure resistance test for pipe and fittings carried out according to ES 1717 and EN 921. Pipes and fittings didn't burst or leak during the stressing period. Time and temperature values must be as in standards.

Marking
Should be in compliance with the requirements of ES 1717standard as well as those of the brand, should include all useful data allowing the traceability of the manufacturing process and all the steps of the quality control.

External Control
External supervision consists of measuring the fixed scope at fixed intervals. The respective supervising institutions appoint the appropriate authorized organization to carry out external supervision. Inspection includes:
External tests of products
Internal audit of Arkan quality assurance system and test procedures
Calibration of test equipment
Hygienic and toxicity tests

Quality management
Arkan is developed and manufactured within an ISO 9001 Quality assurance system. It emphasizes on quality care and continuous improvements in customer satisfaction.

Installation

Introduction
One of the most significant advantages of Arkan PVC-U pipe system is its light weight. This means that the pipe can be easily handled and longer lengths can be installed without sophisticated lifting machinery and with minimum in-trench labor.
Long pipe lengths increase the speed with which a system can be installed, and also mean that pipelines are less susceptible to misalignment and consequent blockage following possible ground movement, than those made up of short pipe lengths.
All pipework must be supported whether vertical or horizontal
Pipe brackets must be used to anchor expansion joints. Intermediate support must also be provided to steady pipework between points
Horizontal pipework requires more frequent support than vertical pipework
Pipework should always be supported close to any change of directions (e.g. Bends or branches)

1 - Cutting
Pipe cut must be upright for proper jointing with fitting socket .

2 - De-burring
Use a file to remove burrs from pipe.

3 - Cleaning
Wipe end of Pipe and inside of fitting with clean cloth to remove dirt, grease and/or moisture. Do NOT apply adhesive until pipe is clean and dry.

4 - Check and mark
Be sure the pipe and/or fitting are evenly cut. Measure the length of the fitting's socket depth and then mark the length on the pipe.

5 - Assembling
Apply a thin coat of the adhesive to outside of pipe and also inside the fitting. While the adhesive is still soft, insert pipe swiftly into the fitting with a 1/4 circle twist. Hold them firmly together 15 to 30 seconds (Hold longer for larger pipes).

Installing of pipe clamps
Arkan waste water piping systems are always to be laid so that they are free of tension and changes in length are not inhibited.
Generally, pipe clamps with inserting tapes are to be used for fixing the pipes. These tapes have to be adjusted to fit the outer diameter of the pipe and must fully surround the pipe. Should no insertion tape be used, the interior edges of the clamps must be rounded and the inner surfaces must be smooth.

Fixed clamps
By fully tightening the pipe clamps, fixed points (fixed clamps) are created in the piping system. They are therefore to be arranged in such a manner that any slipping of a pipe is prevented. In the case of a pipe with a socket, the fixed clamp is to be installed directly behind the socket.
Fittings and groups of fittings are to be fixed points at all times.

Loose clamps
Pipe clamps not completely tightened (loose clamps), when installed, must also allow for a lengthways movement of the piping. Therefore, the inner diameter of the clamp must be slightly greater than the outer diameter of the pipe after installation.

Spacing pipe clamps
For recommended pipe clamp spacing see table below

Nominal Outer Diameter (mm)	Piping	
	Horizontal (m)	Vertical (m)
	0.5	1.2
	0.5	1.2
50	0.5	1.2
75	0.8	2.0
90	0.9	2.0
110	1.1	2.0
125	1.25	2.0
160	1.6	2.0

Special application

The systems are more than adequate for normal domestic applications in low- and high-rise buildings. Where more specialized applications, such as hospitals, industrial kitchens and laboratories are concerned, where prolonged discharges of liquids at elevated temperatures can occur.

Use of short lengths of pipe

PVC-U pipe may be cut on site when shorter lengths are required to suit the installation, or for the installation of fittings.

The cutting of PVC-pipe is easily achieved using a finetoothed handsaw or a PVC-U pipe cutter. The position of the cut should be measured and carefully re-checked before cutting: reasonable accuracy should be exercised to ensure that the cut is square to the axis of the pipe and all burrs must be removed from the cut end before making a joint.

Trenching

There are a lot of important notes must take inconsideration for underground installation of PVC drainage pipe in trench construction: -

- Excavation should comply with all applicable laws and regulations.
- Excavated material such as debris and removed pavement is not suitable for trench backfills.
- Where dewatering is necessary, water should be removed until the pipe has been installed and the backfill has been placed to a sufficient height to prevent flotation of the pipeline.
- The maximum earth load on flexible pipe is the weight of the material directly over the pipe (prism load). Unlike rigid pipe, the width of the excavated trench does not affect pipe loading. Trench width is based solely on practical and economical construction.
- See Figure 3.1 for trench terminology.

Foundation
A foundation is necessary only when native soils are unstable. For such conditions, the trench is over-excavated and a layer of supportive material is placed and compacted to provide a firm foundation for the subsequent pipe embedment materials.

Embedment
This zone is the most important in terms of pipe performance. It is divided into the following subzones:

Bedding
Typically, four to six inches of supportive, compacted material. This zone provides even support for the pipe and brings it to grade.

Haunching
Extends from the bottom of the pipe to the centerline of the pipe (spring line). It provides the most resistance to pipe deflection. Specifying proper materials and compaction are most important for this zone.

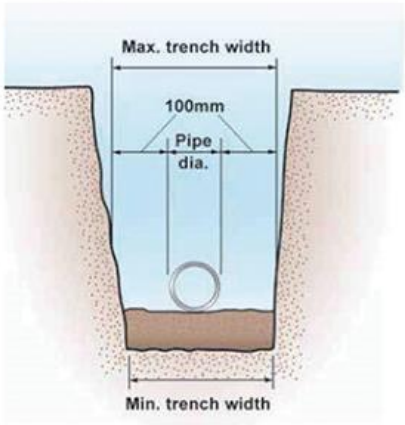
Initial Backfill
Extends from the spring line to a point above the top of the pipe. This zone provides some pipe support and helps to prevent damage to the pipe during placement of the final backfill. The cover extends from the top of the pipe to the top of the initial backfill. The depth of cover should be as much as necessary to protect the pipe during placement of the final backfill. Twelve inches is a common depth of cover.

Final Backfill
This zone extends from the top of the initial backfill to the top of the trench. This zone has little influence on pipe performance, but can be important to the integrity of roads and structures.

Installation Trenches

Trenches should be excavated in accordance with plans and specifications. They should be as narrow as practicable at the level of the top of the pipe and, in a straight trench, have a bed width not less than 200mm wider than the pipe diameter or three-time pipe diameter, to provide working space for the laying crew.

Trenches when excavated are either 'stable' or 'unstable'. The category into which a trench fits is affected by the soil conditions, width, depth and method of excavation. To ensure that maximum support is given to the buried pipe by the undisturbed ground the resultant stable or unstable trench should be treated.

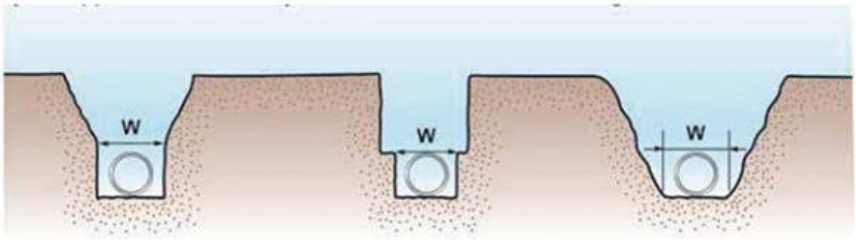


Stable conditions

Stable conditions are those where, after excavation, the trench walls remain solid and do not show any signs of collapse or cave-in. Under such conditions the recommended trench widths are shown in the following table:

Pipe Diameter (mm)	Normal Width (mm)
100	400
160	600
250	750

Unstable conditions
Unstable conditions are those where, during or after excavation, the trench walls tend to collapse and cave-in. Under these conditions, in open or unrestricted areas, the top of the trench can be widened until stability is reached. A smaller trench should then be dug in the bottom of the excavation to contain the pipe as shown. In areas where space is limited, e.g., in streets, it may be necessary to support trench walls by timber or other suitable shoring.



Trench depths
The minimum trench depth should be such that pressures created by the weight of fill material plus anticipated traffic or other superimposed loads will not damage the pipes. As a guide the recommended minimum clear cover above is listed below:

Condition	Min Cover Depth
Where no subject to vehicular loading	300 mm
Where subject to vehicular loading Under driveways In sealed roadways In unsealed roadways	 450 mm 600 mm 750 mm

Laying and Compaction

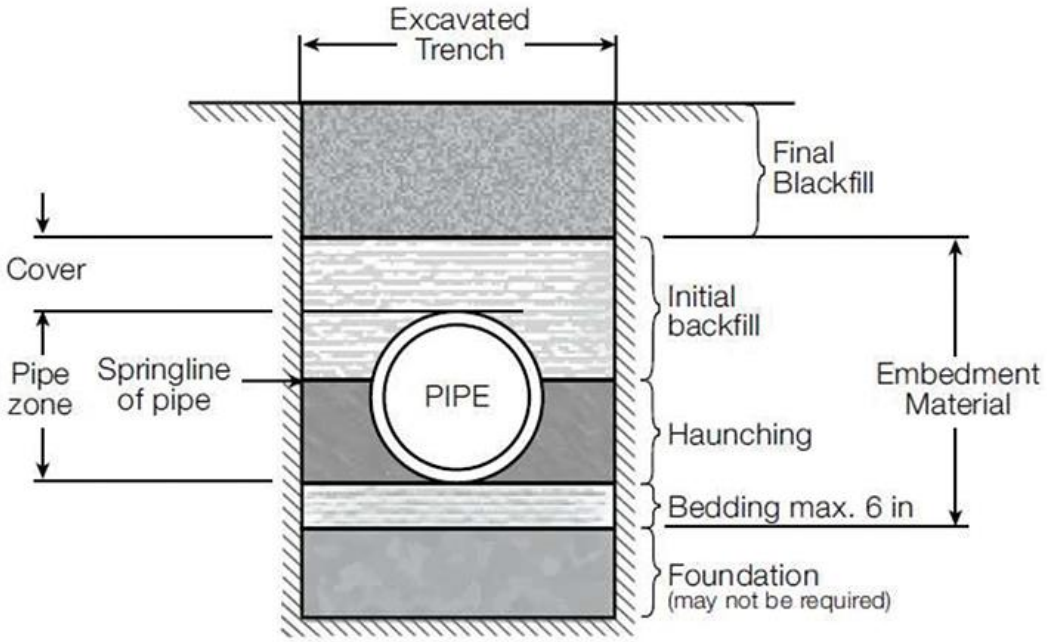
Preparing the trench
The trench bottom should be as level as possible, so that the barrel of the pipe is fully supported along its whole length. In good working conditions, sandy or loamy soil, the trench bottom can be made sufficiently even with stones and rocks removed to provide continuous support for the pipes without the need of under-bedding.

Wet conditions
In wet ground, sloppy working conditions can be alleviated by first placing a layer of hard granular material, or by de-watering the area in and around the trench. If patches of ground are so wet that there is a risk of subsidence and possible damage to sections of the pipeline, these areas should be consolidated by the addition of suitable fill material.

Trench installation

The trench should be excavated deeply enough to allow for the specified grade, the required depth of bedding, and the minimum cover over the pipe.

The figure below suggests the following typical installation in a trench.



The following materials are suitable for bedding and overlay in the trench:

Suitable sand, free from rock or other hard or sharp objects.

Crushed rock or gravel of approved grading up to a maximum size of 14mm

The excavated material, if it is free from rock or hard matter and broken up so that it contains no soil lumps having any dimension greater than 75mm which would prevent adequate compaction of the bedding.

Cement mortar, containing one part of cement and four parts of sand by volume, mixed with clean water to a workable consistency (bedding only).

Completing site work

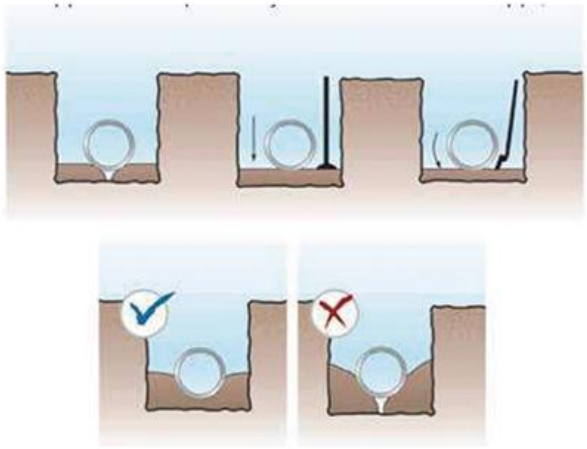
Once the pipe is laid in the trench backfilling can commence. Two distinct phases are involved with pipelines:

backfilling prior to testing the pipeline

backfilling after testing the pipeline

Backfilling usually follows pipe installation as closely as possible in order to protect the pipe from external damage, to eliminate the possibility of the pipe floating due to flooding of open trenches, and to avoid shifting the pipe out of line due to cave-in.
It should be remembered that the purpose of backfilling is not only to protect the pipe by covering it, but to provide firm continuous support under the pipe. Where concrete or mortar bedding has been used, however, the bedding must have obtained its required strength prior to backfilling.

Initial Backfilling
The first step in providing firm continuous support for the pipeline is to tamp soil solidly under the entire barrel of the pipe, care being taken not to disturb the grade.
This backfilling material should be free from stones, rock or clay. When this is not available other suitable material e.g. loamy earth or sand, should be taken to the site. The initial backfill should be placed by hand shovel in layers not exceeding 300mm deep. Each layer should be well tamped round and under the pipeline using the long tamper illustrated. In this way air pockets are eliminated from beneath the pipe.



The layers should be shovelled in and tamped; the process being repeated until the pipe is firmly bedded.
The flat tamper illustrated is used to consolidate this fill to heights of 300mm above the top of the pipe for diameters up to 300mm.
The illustrations A and B below show the wrong and right ways of tamping the initial backfill.
In case A, too much soil is present and the tamping bar cannot compact it properly leaving a void underneath the pipe.
Case B, shows the correct fill of 100mm layer of soil which can be compacted to
Form a firm bed for the pipe

Pipe joints should be temporarily left exposed when placing the initial backfill, to enable pressure tests to be carried out. After testing the line, backfilling and final filling may be completed.

Testing and Inspection

Once the roughing-in is completed on a Arkan system, it is important to test and inspect all piping for leaks. Concealed work should remain uncovered until the required test is made and approved. When testing, the system should be properly restrained at all bends, changes of direction, and the end of runs.

There are various types of procedures used for testing installed plastic systems. However, a water or hydrostatic test is a technically superior test method for inspecting a completed PVC-U piping system installation and is the testing procedure recommended by plumbing code standards. The purpose of the test is to locate any leaks at the joints and correct them prior to putting the system into operation. Since it is important to be able to visually inspect the joints, a water test should be conducted prior to closing in the piping or backfilling of underground piping.

Water Test

The system should be properly restrained at all bends, changes of direction, and the end of runs. To isolate each floor or section being tested, test plugs are inserted through test tees in the stack. All other openings should be plugged or capped with test plugs or test caps.

Fill the system to be tested with water at the highest point. As water fills a vertical pipe it creates hydrostatic pressure. The pressure increases as the height of the water in the vertical pipe increases. Filling the system slowly should allow any air in the system to escape as the water rises in the vertical pipe. All entrapped air in the system should be expelled prior to the beginning of the test. Failure to remove entrapped air may give faulty test results.

Once the stack is filled a visual inspection of the section being tested should be made to check for leaks. If a leak is found, the joint must be cut out and a new section installed. Once the system has been successfully tested, it should be drained and the next section prepared for testing.

Completing Final Backfill

After testing of the pipeline, selected material should be hand shoveled over each exposed joint and tamped to give 300mm minimum cover. Final backfilling to ground level can be completed by hand or machine, using the soil originally excavated from the trench. Care should be taken to exclude large rocks and stones from the final backfill.

4.12 Pipe assembly

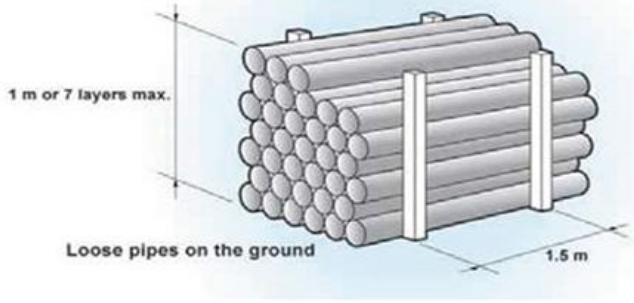
Basic Principles of Solvent Cement Welding

The joint surfaces must be softened and remain wet with solvent cement during joint assembly.
Sufficient solvent cement must be applied to fill the gap between the pipe and fitting.
Assembly must be made while the surfaces are still wet and the solvent cement
Joint strength develops as the solvents evaporate from the joint.
Cleaner primer must be used to prime and clean all jointing surfaces, prior to application of solvent cement. No exceptions. Cleaner primer softens the surface and is essential to a successful jointing process.

Do not prepare the surface using sand paper as contamination can occur.
No additive of any kind should be introduced to the cleaner primer, or to the solvent cement. Ensure that the solvent cement is in good condition and runs freely from the brush.
If the cement does not run freely or appears "globular" or "tacky", discard and use fresh stock of solvent cement.
Ensure that the cement is within its recommended "use by" date.
In cold weather conditions, solvents penetrate and soften the PVC surfaces much slower. Therefore, it is more important to pre-soften the jointing surfaces with cleaner primer. Because of slower evaporation of the solvents a longer cure time will be necessary.
We recommend the use of disposable polyethylene gloves when applying cleaner primer and solvent cement fluids.
Solvent cement and cleaner primer are highly inflammable liquids and should be kept away from all sources of ignition, they may be harmful if swallowed or inhaled and may cause skin or eye irritation. Avoid breathing the vapor, use in well ventilated areas.

STORAGE

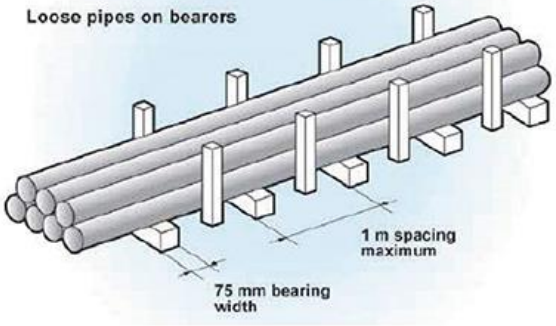
Storage, Handling and Transportation
Storage
The following recommendations relate to the storage of Arkan PVC-U pipes under the normal climatic conditions.
Pipes should be uniformly supported throughout their length, if this is not possible timber battens at least 75mm wide at spacing's not greater than 1m centers should be placed beneath the pipes.
Preferably pipes of different sizes and wall thicknesses should be stacked separately. Where this is not possible the pipes with larger diameters and thicker walls should be at the bottom. It is preferable that pipes should not be stacked one inside the other.



Pipe stacks should not exceed 7 layers with maximum height of 1m.

Ideally, stacks should contain one diameter pipe size only. Where this is not possible, stack largest diameter pipes at base of stack. Small pipes may be nested inside larger pipes.
If stored in the open for long periods, or exposed to strong sunlight, cover the stack with opaque sheeting.
Store fittings under cover. Do not remove from cartons or packaging until required. Store solvent

cement and cleaning fluid in a cool place.
Ultra-violet light can affect pipes and fittings: pipe color may change



Handling
Pipes made from PVC-U are strong, though lightweight and are therefore very easily handled. However, it is necessary to take care to prevent damage; in particular, pipes should not be thrown, dropped or dragged along. If pipes are moved by rolling it is necessary to support them along their length and properly restrain them on inclines.
If pipes are loaded or unloaded by mechanical means (forklift, crane etc.,) care should be taken to prevent damage. Pipes should be properly supported in two places when lifted. Preferably protected slings should be used, if metal chains and hooks are all that is available, padding should be placed between them and the pipes. If pipes are delivered stuffed, special care should be taken to avoid damage during unloading.
Take all reasonable care when handling PVC, particularly in very cold conditions when the impact strength of the material is reduced.
Do not throw or drop pipes, or drag them along hard surfaces.
In case of mechanical handling, use protective slings and padded supports. Metal chains and hooks should not make direct contact with the pipe.

Transportation
Vehicles with a flatbed should be used for the transport of pipes. The bed should be free from nails or other projections. Each pipe should be supported uniformly along its length. Vehicles holds have adequate side supports at not more than 1.5m centers and pipes should be well secured during transit. All uprights should be flat and free from sharp edges.
Pipes should be loaded onto vehicles in such a way that any overhang does not exceed 1m.
Thick-walled pipes must be loaded before thin-walled pipes.

Registration Certificate

This is to certify that the management system of

Ak Arkan Plast

have been assessed by AJA EGYPT and registered against the requirements of

ISO 9001:2015

Scope of Registration

Production of (PVC & PPR) Pipes & Fittings.

Sites Registered

Plot Number 17, Block 12002, North Extension, Industrial Zone, El Obour City, Al Qaliyubia, Egypt.

Certificate Number:	**AJAEG/22/10038Q**	**Date Original Registration:**	**12th October 2022**
Expiry Date:	**11th October 2025**	**Date of Re-registration:**	**N/A**
Previous Expiry Date:	**N/A**	**Next Re-Audit Due Date:**	**11th September 2025**
Revision Date:	**N/A**	**EAC:**	**14**

Mustafa Osman

Operation Manager, AJA EGYPT

EGAC Accredited QMS Certification CAB # 012207

IAF MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT

AJA

This Certificate is the property of AJA EGYPT, Villa 131, Banafseg 8, 1st Settlement, New Cairo city, Cairo, Egypt, and must be returned on request.
www.ajaegypt.com