PVC-U PRESSURE PIPE SYSTEM

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P V C - U

PERMANENT SOLUTION FOR COLD POTABLE WATER SUPPLY PIPELINES AND VARIOUS OTHER APPLICATIONS

Certificate No GB09/78780

Pakistan Standards

DADEX

OVER 55 YEARS OF EXCELLENCE

Introduction

Dadex has been manufacturing unplasticized Polyvinylchloride (uPVC) Pressure Pipes since 1991. Dadex is the exclusive licensee of Wavin Overseas b.v., of the Netherlands, which is one of world's largest thermoplastic pipes manufacturer. It has state of the art equipment for manufacturing uPVC pressure pipes conforming to Pakistan Standard PS 3051:1991 and British Standard BS 3505.

Dadex uPVC pressure pipes have excellent physical and chemical characteristics due to which it is suitable for cold potable water supply applications. Dadex uPVC pressure pipes also have exceptional hydraulic capabilities and strong resistance to deterioration.

Available Range of Sizes and Pressure Classes

Dadex uPVC pressure pipes are available in nominal diameter in standard length of 4m and 6m.

DIAMETERS													
¾"	1"	1¼"	1½"	2"	2 ½"	3"	4"	6"	8"	10"	12"	14"	16"

WORKING PRESSURE		
CLASS	bar / Kg/cm^2)	(lb/In^2)
B	6	87
C	9	130
D	12	173
E	15	217

Standards & Quality Assurance

Dadex is the only pipe manufacturer in Pakistan that produces high quality rubber rings conforming to Pakistan Standard PS 1915:1987 and British Standard BS 2494 Specifications for 'Z' joint uPVC Pressure Pipes.

Dadex uPVC pressure pipes comply with relevant national and international standards. In-house testing laboratory equipped with latest testing equipment is used to ensure quality.
Laboratory testing of uPVC Pressure Pipes is carried out as per PS 3051: 1991 and (BS 3505) and include following tests:

1. Visual Inspection
2. Dimensional Analysis
3. Methylene Chloride Test
4. Impact Resistance Test
5. Heat Reversion Test
6. Resistance to Delamination
7. Short term Hydrostatic Pressure Test

Dadex has a team of trained Sales & Technical staff to assist customers for their specific needs and provide support on site issues that may be required during laying, testing and commissioning of pipe system.

Durability

Non-corrosive and non-abrasive qualities of Dadex uPVC pressure pipes prevent degradation of the pipe system. However Prolonged exposure of Dadex uPVC pressure pipes to sun light can result in color fading, reduction in impact strength and slight increase in tensile strength.

Advantages

Dadex uPVC pressure pipes are safe for cold potable water distribution and transmission systems. The material does not support any microbial growth & prevents contamination of water. The non-corrosive nature of material and leak proof joints limit the tendency of mixing suspended particles and other contaminations that ensures risk-free distribution of water.

Fields of Application

- Infrastructure Water Mains / Potable Water and Fire-Ring Mains
- Infrastructure Sewage Mains / Pumped or Gravity Flow
- Drainage Installations / Domestic or Industrial
- Factory Supply Lines
- Slurry Lines
- Effluent Lines
- Chemical Plant Installations
- Live Stock Whey Feed Pipes
- Paper Mill Installations: For Alum and Pulp Carrying
- Chilled Water Lines for Refrigeration and Air Conditioning Plant/Cooling Tower
- Coal Washing Plant
- Power Station Screening Plant Pipelines
- Power Station Chlorination Plant
- Fume Extraction Ducts
- Water Aeration Plant
- Agriculture & Irrigation

Features

- Smooth bore with minimal frictional losses
- Non-flammable/self-extinguishing
- Leak-proof joints
- Resistant to chemicals
- Light weight
- Durable
- Non-conductor of electricity
- Non-corrosive and non-abrasive
- Non-contaminating and non-toxic
- Highly resistant to microbial growth

Excellent Hydraulic Characteristics

Low roughness coefficient of pipes and joints reduces frictional losses to a greater extent than conventional materials. Low frictional losses ultimately result in reduced costs that are spent on high capacity pumps, maintenance expenditures etc in case of conventional material.

Non-Conductive and Non-Flammable

The use of uPVC pipes (buried or above ground) is very much supported by its non-conductive and non-flammable/self-extinguishing property. These outstanding features have made the material suitable for residential, industrial or commercial purposes.

Easy to Handle

Dadex uPVC pressure pipes are much lighter than ductile iron, steel and reinforced concrete pipes, which significantly reduces transportation costs and result in easy and quicker jointing.

Resistance to Corrosion

The non-corrosive nature of material and leak proof joints limit the tendency of mixing suspended particles and other contaminations that ensures risk-free distribution of water.

Resistance to Chemicals

Dadex uPVC pressure pipe is highly resistant to aqueous salt solution, mineral acids and alkalis. However, it is not recommended for highly concentrated oxidizing agents, organic esters, ketones, aromatic and chlorinated hydrocarbons, whether as a flowing fluid or their presence in surrounding soil.

Physical Properties of Dadex uPVC Pressure Pipes at 20°C

Technical Terms	Typical Value	Unit
Density	1.42 ~1.46	gm/cc
Modulus of elasticity at 20 °C	30,000	Kgf/cm^2
Specific heat at 20 °C	0.24	Cal/gm/°C
Vicat softening point	85	°C
Thermal conductivity	0.12~0.14	$Calm/m^2h°C$
Coefficient of linear thermal expansion	7 to $8x10^{-5}$	m/m/°C
Inflammability	do not support combustion	-
Min. radius of curvature (cold bending radius)	*200 x Outside Diameter (at temp. ≥ 5°C)	-

Marking

Dadex uPVC pressure pipes are marked with the following information at every meter interval along the length of the pipe.

- Dadex
- Material (i.e. PVC-U)
- Relevant standard (i.e. BS 3505 / PS 3051)
- Nominal size of pipe
- Pressure class in bars
- Manufacturing date

Temperature Effect :

Thermoplastics are sensitive to temperature changes in contrast to conventional materials. Although the softening point of uPVC is greater than 80°C, it is advisable not to operate it at temperatures higher than 45°C for longer periods. At freezing point or below, the increase in volume of water inside will not crack or burst the pipe because of elastic property of the material. Two important characteristics of uPVC pressure pipes that need to be considered are the drop in pressure rating at elevated temperatures and the thermal expansion/contraction.

Performance of uPVC Pipe at Variable Temperature :

Pressure ratings of uPVC pipes (as described in section Table-1) are designed at 20°C (reference temperature). At higher temperature, reduction in permissible working pressure is necessary to obtain the same service life as at a 20°C operating temperature.

Following graph shows the maximum allowable working pressure at temperatures higher than reference temperature (20°C).

Pipe Dimensions for Classes B, C, D and E (PS 3051 & BS 3505)

Nominal Size	Mean Outside Diameter		Wall Thickness											
			Class B (6.0 bar)			Class C (9.0 bar)			Class D (12.0 bar)			Class E (15.0 bar)		
			Average Value	Individual Value		Average Value	Individual Value		Average Value	Individual Value		Average Value	Individual Value	
	min.	max.	max.	min.	max.	max.	min.	max.	max.	min.	max.	max.	min.	max.
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
*3/8"	17.0	17.3	-	-	-	-	-	-	-	-	-	1.9	1.5	1.9
½"	21.2	21.5	-	-	-	-	-	-	-	-	-	2.1	1.7	2.1
¾"	26.6	26.9	-	-	-	-	-	-	-	-	-	2.5	1.9	2.5
1"	33.4	33.7	-	-	-	-	-	-	-	-	-	2.7	2.2	2.7
1¼"	42.1	42.4	-	-	-	-	-	-	2.7	2.2	2.7	3.2	2.7	3.2
1½"	48.1	48.4	-	-	-	-	-	-	3	2.5	3	3.7	3.1	3.7
2"	60.2	60.5	-	-	-	3	2.5	3	3.7	3.1	3.7	4.5	3.9	4.5
*2½"	75	75.3	-	-	-	3.5	3	3.5	4.5	3.9	4.5	5.5	4.8	5.5
3"	88.7	89.1	3.4	2.9	3.4	4.1	3.5	4.1	5.3	4.6	5.3	6.5	5.7	6.6
4"	114.1	114.5	4	3.4	4	5.2	4.5	5.2	6.8	6	6.9	8.3	7.3	8.4
*5"	140	140.4	4.4	3.8	4.4	6.3	5.5	6.4	8.3	7.3	8.4	10.1	9	10.4
6"	168	168.5	5.2	4.5	5.2	7.5	6.6	7.6	9.9	8.8	10.2	12.1	10.8	12.5
*7"	193.5	194	6	5.2	6	8.7	7.7	8.9	11.4	10.1	11.7	13.9	12.4	14.3
8"	218.8	219.4	6.1	5.3	6.1	8.8	7.8	9	11.6	10.3	11.9	14.1	12.6	14.5
*9"	244.1	244.8	6.7	5.9	6.8	9.8	8.7	10	12.9	11.5	13.3	15.8	14.1	16.3
10"	272.6	273.4	7.5	6.6	7.6	10.9	9.7	11.2	14.3	12.8	14.8	17.5	15.7	18.1
12"	323.4	324.3	8.8	7.8	9	12.9	11.5	13.3	17	15.2	17.5	20.8	18.7	21.6
14"	355	356	9.6	8.5	9.8	14.1	12.6	14.5	18.6	16.7	19.2	22.8	20.5	23.6
16"	405.9	406.9	10.9	9.7	11.2	16.2	14.5	16.7	21.1	19	21.9	26	23.4	27
18"	456.7	457.7	12.3	11	12.7	18.2	16.3	18.8	23.8	21.4	24.6	-	-	-
20"	507.5	508.5	13.7	12.2	14.1	20.2	18.1	20.9	-	-	-	-	-	-
22"	558.3	559.3	15	13.4	15.5	22.1	19.9	22.9	-	-	-	-	-	-
24"	609.1	610.1	16.3	14.6	16.8	24.1	21.7	25	-	-	-	-	-	-

- Pipes are normally manufactured with socket at one end (to suit either Solvent-Cement or Z-joint system); however pipes with both ends plain can also be available.

* Pipe to these nominal sizes are not normally available from stock.

Dadex Antimicrobial uPVC Pipes :

Dadex is committed to water conservation as well as the supply of safe water for health and well-being of our people. To this purpose, Dadex has once again brought a revolutionary technology for the first time in the piping industry of Pakistan, by introducing Antimicrobial pipes containing state of the art Antimicrobial Technology, developed by a UK based company having its network in 98 countries.

uPVC pressure pipes are also available, if required, with Dadex Antimicrobial Technology.
Dadex antimicrobial pipes have 99.99% antimicrobial efficacy and provide long lasting protection against Bacteria, Fungi and Algae; hence providing safe and healthy water.

Why Dadex Antimicrobial Pipes :

Pipes are the backbone of water distribution systems in building and infra-structure, and once incorporated, lasts as long as the life span of structure. Water distribution systems provide a suitable milieu for micro-organisms: Bacteria, Fungi and Algae. Microbes which survive in the distribution system possess the ability to grow and produce BIOFILM, a surface deposit of microorganisms, and organic and inorganic materials that accumulate within a slime layer. Biofilms induce many problems in water distribution systems like: change in color, odor, taste and turbidity of water, blockage of pipes and inefficacy of disinfection treatment. The Slimy layer of biofilm act as a slow-release mechanism for persistent contamination of water.

The microbial contamination and buildup in water distribution pipes pose a direct risk to public health because of water-borne diseases. Most common disease causing microorganisms associated with water contamination are Pseudomonas, Aeromonas, Klebsiella, E.coli, Helicobacter, Vibrio spp. Shigella, Salmonella, Legionella spp. Aspergillus, Cryptococcus and Mucor. These pathogens can cause serious illnesses like diarrhea, dysentery, gastroenteritis, allergies, skin infection, etc.

Water-borne diseases pose serious threat to public health:

- According to WHO (2014), every year more than 3.4 million people die as a result of water-related diseases, making it the leading cause of morbidity and mortality around the world.
- 1.8 million People die every year from diarrheal diseases. 90% percent are children under 5, mostly in developing countries.
- 88 % of diarrheal disease are attributed to unsafe water supply, inadequate sanitation and hygiene. (WHO).
- Elderly people, children, people with weak immune system and pregnant women are more susceptible to water borne diseases.

Dadex has make the piping system microbe-free by incorporating Antimicrobial Technology, as bacteria lands on the inner pipe wall, antimicrobial technology eliminates the bacteria and support to provide safe water.

Dadex antimicrobialpipes eradicate the bacteria in pipes surfaces and protect against the development of microbial biofilm in water distribution systems. The built-in antimicrobial technology becomes an integral part of the finished product.

The antimicrobial additive being used by Dadex in Antimicrobial pipes has been tested against over 50 dangerous microorganisms including: MRSA, E. coli Salmonella, Klebsiella pneumoniae, Staphylococcus aureus, Pseudomonas aeruginosa, Clostridium difficile, A. niger Corynebacterium spp, Escherichia coli. The Dadex Antimicrobial products have built-in anti-fungal, anti-bacterial, anti-mold, anti-mildew and anti-algal protection, providing a broad spectrum of total anti-microbial performance.

How Dadex Antimicrobial Pipes works?

The Antimicrobial Technology provides effective and broad spectrum anti-microbial performance

Antimicrobial Process - 3 Stages

Stage-1

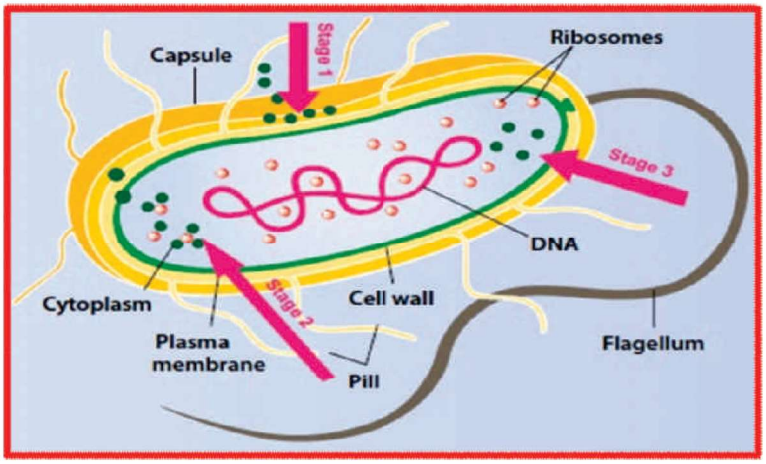
Antimicrobial ability enters the bacterial membrane and cause damage and disruption to the cellular wall before penetrating the cell.

Stage-2

Antimicrobial ability is highly reactive with the cell enzymes and can deactivate these vital molecules.

Stage-3

It interrupt the cell DNA, preventing replication and cell formation. Provides bacterial safe, healthy drinking water.



Features of Dadex Antimicrobial pipes :

- Built-in Antimicrobial Protection against Bacteria, Fungi and Algae.
- Dadex Antimicrobial Pipes are tested by Intertek for Antimicrobial performance
- Maximum protection against water borne diseases and bio-film development.
- 99.99% Antimicrobial efficacy against microorganisms
- Effective and long-lasting antimicrobial protection that keeps the pipe safe from bacteria and provides healthy water.
- Improves water quality and prevents the development of bad tastes and odors in water.

American and US Standards Compliance :

The Dadex Antimicrobial Pipes conforms to the following standards for its antimicrobial efficacy.

Anti-fungal testing	ISO16869:2008, ASTM G21-09 and ASTM E 2180
Anti-bacterial testing	ISO 22196:2011 and JIS Z 2801
Anti-algae testing	ASTM D 5589-09 and prEN WD algae

DADEX Antimicrobial Pipes

A Promise of Healthy Living !

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