



# **Complete Pipe System Catalogue**



0mm ISO 161/1 PN16 221601 (SHIFT2) (R1)



# Worldwide Supplier of Quality Piping Solutions Since 1975

Pipe Systems for :

Water Distribution Network, Irrigation, Borewell, Electrical Systems,  
Telecommunication Systems and Drainage & Sewerage Network



**N**ational Plastic was founded in 1975 by Dr. Antoun Kronfli who had an extraordinary vision to create a global company that could manufacture and supply the highest quality thermoplastic piping products to the international market.

The company was established with a philosophy to employ the latest technology and equipment to manufacture a quality range of piping systems. It has continually evolved to be a major supplier to projects and customers around the world.

Over the last 3 decades, National Plastic products have been used in thousands of projects in over 65 countries, 4 continents and have established an excellent reputation for quality, reliability and performance in the most demanding conditions.

Worldwide users include municipalities, water authorities, public work departments, development banks, major international contractors, United Nation organizations, telecommunication companies, government ministries, global development companies, major distributors and aid agencies.

National Plastic always strives to meet its client needs and requirements. The company has an ISO 9001:2008 Quality Management System from British Standard Institute (BSI) a leader in quality management certification. It holds numerous internationally recognized product certifications such as WRAS, Kitemark and UL.

National Plastic has an extensive portfolio of products made in various materials such as UPVC, CPVC, HDPE, LLDPE and PP which are used in the following sectors.

- Agricultural, landscape and golf course irrigation systems
- Rural water supply networks, town water supply for potable water
- Underground well casing and screens for water supply, mining and cathodic protection
- Above and below ground drainage and sewerage systems for all applications
- Conduits for electrical and cabling systems
- Duct pipes for telecommunication and fibre optic networks
- Industrial piping systems with high chemical resistance for industry
- Piping systems for commercial and residential high rise building
- Piping system for environmental monitoring system
- Acoustic, sound proof drain piping systems

The extensive product list covers most of the major international standards including ISO, Metric and Imperial dimensions. Continual development

ensures the range expands to meet current market demand and requirements.

In addition to the extensive piping range National Plastic produces and stocks a wide range of fittings, valves and accessories to ensure an integrated complete piping system and has a number of world leaders as strategic partners. By sourcing your complete requirements from National Plastic you are assured of having a fully integrated and compliant piping system for each and every application.



**National Plastic** offers a comprehensive and integrated pipe network system to distribute water from the point of source to the point of use and from the point of use to point of disposal serving all points and every connection in between, in every conceivable corner of the globe.



# PIPES and FITTINGS

Manufacturer and Worldwide Supplier of Comprehensive and

## uPVC Pressure Pipes for Water Distribution

SPECIFICATION	APPLICATION	RATING	SIZES
EN ISO 1452 Inch	Pressure	PN9	1/2" - 16"
EN ISO 1452 Inch	Pressure	PN12	1/2" - 16"
EN ISO 1452 Inch	Pressure	PN15	1/2" - 16"
EN ISO 1452 Metric	Pressure	PN6	40 - 500 mm
EN ISO 1452 Metric	Pressure	PN8	32 - 400 mm
EN ISO 1452 Metric	Pressure	PN10	32 - 400 mm
EN ISO 1452 Metric	Pressure	PN12.5	25 - 400 mm
EN ISO 1452 Metric	Pressure	PN16	20 - 400 mm
EN ISO 1452 Metric	Pressure	PN20	20 - 400 mm
EN ISO 1452 Metric	Pressure	PN25	110 - 200 mm
EN ISO 4422	Pressure	PN6	63 - 400 mm
EN ISO 4422	Pressure	PN6.3	40 - 500 mm
EN ISO 4422	Pressure	PN8	40 - 400 mm
EN ISO 4422	Pressure	PN10	32 - 400 mm
EN ISO 4422	Pressure	PN12.5	25 - 400 mm
EN ISO 4422	Pressure	PN16	20 - 400 mm
EN ISO 4422	Pressure	PN20	110 - 400 mm
EN ISO 4422	Pressure	PN25	20 - 200 mm
DIN 8062	Pressure	PN4	75 - 500 mm
DIN 8062	Pressure	PN6	50 - 500 mm
DIN 8062	Pressure	PN8	40 - 400 mm
DIN 8062	Pressure	PN10	32 - 400 mm
DIN 8062	Pressure	PN12.5	25 - 400 mm
DIN 8062	Pressure	PN16	20 - 400 mm
DIN 8062	Pressure	PN20	20 - 315 mm
DIN 8062	Pressure	PN25	20 - 280 mm
ISO 161/1	Pressure	PN 6.3	50 - 500 mm
ISO 161/1	Pressure	PN 10	40 - 400 mm
ISO 161/1	Pressure	PN 16	20 - 400 mm
ISO 161/1	Pressure	PN 20	20 - 400 mm
ISO 161/1	Pressure	PN 25	20 - 400 mm
AS/NZS 1477	Pressure	PN4.5 - PN18	DN15 - DN375 mm
BS 3505	Pressure	Class B (6 Bar)	3 - 16 inch
BS 3505	Pressure	Class C (9 Bar)	2 - 16 inch
BS 3505	Pressure	Class D (12 Bar)	1 1/4 - 16 inch
BS 3505	Pressure	Class E (15 Bar)	1/2 - 16 inch
BS 3505	Pressure	Class 7	1/2 - 16 inch
ASTM 1785	Pressure	Schedule 40	1/2 - 16 inch
ASTM 1785	Pressure	Schedule 80	1/2 - 16 inch
ASTM D2241	Pressure	SDR 41 - 100 psi	4 - 16 inch
ASTM D2241	Pressure	SDR 32.5 - 125 psi	3 - 16 inch
ASTM D2241	Pressure	SDR 26 - 160 psi	1 - 16 inch
ASTM D2241	Pressure	SDR 21 - 200 psi	3/4 - 16 inch
ASTM D2241	Pressure	SDR 17 - 250 psi	3/4 - 16 inch
ASTM D2241	Pressure	SDR 13.5 - 315 psi	1/2 - 6 inch
DIN 8079 / 8080 (CPVC)	Hot Water	PN16	16 - 250 mm
ASTM F441 (CPVC)	Hot Water	SCH80 / SCH40	1/2 - 12 inch

## uPVC Pipes for Land Drainage & Sewerage

SPECIFICATION	APPLICATION	RATING	SIZES
BS 5255	Waste	Drainage	1 1/4 - 2 inch
BS 4514	Soil	Drainage	3, 4 & 6 inch
BS 4660	Underground	Drainage	4 & 6 inch
BS 5481	Gravity Sewer	Drainage	8, 10, 12 & 16 inch
EN 1329	Soil & Waste	Drainage	36 - 400 mm
EN 1401	Underground Drain	Drainage	110 - 500 mm

### Conduit Pipes for Electrical Systems

SPECIFICATION	APPLICATION	RATING	SIZES
BS 4607	Conduit	Duct	3/4 - 1 1/2 inch
DIN 8062	Non-Pressure	Series 2 (4 Bar)	75 - 400 mm
BS 3506	Non-Pressure	Class O	2 1/2 - 10 inch
NEMA-TC2	Non-Pressure	Duct	1/2 - 6 inch
NEMA-TC6 (EB)	Non-Pressure	Duct	2 - 6 inch
NEMA-TC6 (DB)	Non-Pressure	Duct	2 - 6 inch
NEMA-TC8 (EB)	Non-Pressure	Duct	2 - 6 inch
NEMA-TC8 (DB)	Non-Pressure	Duct	1 - 6 inch
UL651 NEMA-TC2	Non-Pressure Sch40	Conduit	1 1/4" - 6"

### Duct Pipes for Telecommunication Systems

SPECIFICATION	APPLICATION	RATING	SIZES
BPO	Telephone Duct	Duct 54 / 56	2 - 3 1/2 inch

### Polyethylene Pressure Pipes

SPECIFICATION	APPLICATION	RATING	SIZES
ISO 4427	Cold Water	PN 3.2 - PN 16 (SDR32-7.4)	16 - 400 mm
DIN 8074	Cold Water	PN 3.2 - PN 16 (SDR32-7.4)	16 - 400 mm
EN12201	Cold Water	PN 3.2 - PN 16 (SDR32-7.4)	16 - 400 mm
DIN 8072	Cold Water	PN 2.5 - PN 10	10 - 110 mm
ASAE S435	Drip Tubing	50 - 69 psi	1/2 - 1 inch
AUST STD 2698-1	Drip Tubing	45 - 60 psi	13 - 32 mm
BS 1972 / 67	Cold Water	PN 6.1 - PN 12.2	3/8 - 4 inch

### uPVC Pressure Fittings



**FIP** - Italy  
(Metric & Imperial)



**Spears** - USA  
(Metric & Imperial)



**NPI** - UAE  
(Imperial)



**MP16** - UAE  
(Metric)

### Drainage & Sewerage Fittings



**Ostendorf** - Germany



**Ezyflo** - UAE



**REDI** - Italy



**IPS Weldon** - USA



# A Few Worldwide Projects

National Plastic products have been used in thousands of projects in four continents.

## AFGHANISTAN

- Water Distribution Network for relief project in Kabul
- uPVC well casing and screen for Aid Agency project

## ALGERIA

- Water well projects

## ANGOLA

- Rural water distribution

## AUSTRALIA

- Environmental Monitoring System

## AZERBAIJAN

- AGT Pipeline Facilities, Baku

## BAHRAIN

- Irrigation Network System
- Municipal Water Supply

## BANGLADESH

- Telecommunication Network Dhaka

## CAMBODIA

- Village Water Supply System in Phnom Penh

## CAPE VERDE

- Water Distribution Network

## CHAD

- Water well projects

## CHINA

- UN Funded Water well projects

## COMOROS

- Water Distribution System

## CONGO

- uPVC & CPVC Pipe System for 100 Villa Project, Kinshasa

## CYPRUS

- Water Supply Distribution Network

## DJIBOUTI

- Housing Drainage Network Djibouti

## EGYPT

- Water Supply Distribution System Cairo

## ERITREA

- Town Water Supply & Drainage Network, Asmara
- Drip Irrigation System Citrus Fruit Farm, Asmara

## ETHIOPIA

- Town Water Distribution Network Addis Ababa
- Town Sewerage & Drainage Addis Ababa

## FRANCE

- Drip Irrigation System Paris

## GAMBIA

- Rural Water Distribution

## GEORGIA

- Water Supply Distribution Network

## GERMANY

- Environmental Monitoring System

## GHANA

- UPVC fittings for building projects

## HONGKONG

- uPVC Pipe System for Government projects

## INDIA

- Pilot Drip Irrigation System for Horticultural Project in Central India.
- UPVC pipes for golf course

## IRAQ

- uPVC Pipes and Fittings for UN funded water distribution projects

## ITALY

- Pipe & Irrigation System

## JAPAN

- Micro Irrigation System for Greenhouse Company

## JORDAN

- Casing & Screen for rural water well projects
- uPVC Pipe System for water supply network

## KENYA

- Water well projects
- Drip Irrigation System

## KUWAIT

- uPVC Pipes for Kuwait Oilfield installation
- LDPE pipes for Kuwait Oil Company.

## KYRGHYZSTAN

- Housing complex Water Distribution Network, Bishkek

## LAOS

- Water Supply Distribution Network

## LEBANON

- Drainage Pipes for housing project in Beirut

## LIBYA

- Water well Projects
- Cathodic Protection System

## MAURITIUS

- uPVC Pipes for Water Supply & Irrigation, Port Louis

## MADAGASCAR

- Water well Projects

## MALAYSIA

- Water well Projects

## MOROCCO

- Water Distribution Network Rabat

## NEPAL

- Water Distribution Networks Katmandu

## NEW ZEALAND

- Micro Irrigation equipment for irrigation company

## OMAN

- uPVC Well Casing and Screens for various agriculture projects
- Waterproofing Roof coating Ministry of Agri., Inform & Health Muscat

## PAKISTAN

- Telecommunication Network Karachi
- uPVC Pipe / Well casing and screen for UN funded projects

## PHILIPPINES

- UPVC pipes for golf course

## QATAR

- Central A/C Coating System, Sports Stadium, Doha
- uPVC Pipes for Ras Laffan Housing Project

## RUSSIA

- Fit-Flex for building projects

## RWANDA

- Village Water Supply Network Kigali

## SAUDI ARABIA

- Telephone duct for Saudi Arabia Telecom
- uPVC Pipes for various irrigation / landscape projects

## SENAGAL

- Water Supply Network

## SINGAPORE

- Water Supply System

## SOMALIA

- Rural Water Supply System

## SPAIN

- Heavy duty casing & screen for Power Generating Authority in Northern Spain

## SRI LANKA

- Various Waterproofing Roof Coating projects

## TANZANIA

- Village Water Supply System Dares salaam
- Musoma Water Supply and Sanitation Project

## TURKMENISTAN

- Residential Water Supply System, Ashgabat

## UNITED ARAB EMIRATES

- Abu Dhabi Gate City, Abu Dhabi
- Al Raha Beach Resort, Abu Dhabi
- Bloom Marina, Abu Dhabi
- Conference Palace Hotel, Abu Dhabi
- Hydra Avenue Tower, Abu Dhabi
- Presidential Palace, Abu Dhabi
- Reem Island, Abu Dhabi
- Saadiyat Island, Abu Dhabi
- Yas Island, Abu Dhabi
- Medical College, Al-Ain
- Akoya Oxygen, Dubai
- Arabian Ranches, Dubai
- Burj Khalifa, Dubai
- Bvlgari Resort and Residence, Dubai
- DIFC Gate Avenue, Dubai
- Dubai Arena, Dubai
- Dubai Creek Harbour, Dubai
- Expo 2020, Dubai
- Falcon City of Wonders Community, Dubai
- Festival City, Dubai
- Green Community, Dubai
- International Airport Expansion, Dubai
- International City, Dubai
- Jumeirah Beach Residence, Dubai
- Jumeirah Lake Towers, Dubai
- Jumeirah Village, Dubai
- Mohammed Bin Rashid Al Maktoum City District One, Dubai
- Mag Creek Resort, Dubai
- Meydan One Mall, Dubai
- Motiongate, Dubai
- Nakheel Mall, Dubai
- Palm Islands, Dubai
- Royal Atlantis, Dubai
- Serena, Dubai
- Viceroy Hotel Resort, Dubai
- Water Canal, Dubai
- Ice Land Water Park, Ras Al Khaimah
- Marjan Island, Ras Al Khaimah
- Al Noor Mosque, Buhairah Corniche, Sharjah

## UGANDA

- Water Supply Distribution Network Kampala

## UNITED KINGDOM

- Water Supply Network in Central England

## UZBEKISTAN

- Golf Course Irrigation Network System, Tashkent

## VIETNAM

- uPVC Well Casing & Screen for Aid project
- uPVC pipes & fittings for town water supply
- uPVC pipes for several golf courses

## ZAMBIA

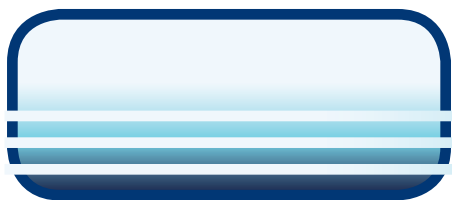
- Water well Projects

# Pressure Pipe System

Imperial & Metric Range



ASTM 1785 • ASTM 2241 • BS 3505  
EN 1452-2:2009 • EN ISO 4422-2:1996  
ISO 161/1 • DIN 8062:2009



# uPVC Pressure Pipe System

## Pressure Pipe System

National Plastic produces a wide range of UPVC Pressure Pipes to most of the major international standards and dimensions of Metric and Imperial. The pipes are made from 100% virgin UPVC resin and have a minimum required strength  $MRS=25 \text{ mpa}$  so that the pipes meet or exceed the rigorous hydrostatic requirements of the standards. The pipes are produced in a range of colours such as grey, white, blue, purple and carry full printing and identification at 1m intervals according to the standard requirements.

Pipes can be supplied with integral solvent weld joints along with Weldon 717 cement or rubber ring joints using high performance EPDM seals to EN681. The joints exceed the pressure rating of the pipe and can therefore cover all the applications where the pipes are installed.

All pipes produced fall under an ISO 9001:2008 Quality Assurance system and several ranges carry third party verification such as the BSI Kitemark or WRAS certification so customers are assured the pipes are of the highest quality. For export requirements pipes can be supplied in 5.8m (19ft) lengths so they can be loaded into containers without damaging sockets. National Plastic pressure pipes have been operating in demanding conditions for almost 40 years now (See the Worldwide Projects List) and is proof of their outstanding quality and serviceability.

### Mechanical and Physical Properties

Material Strength	$MRS \geq 25 \text{ MPa}$	EN921
Impact Resistance	$TIR \geq 10\%$	EN744
Tensile Strength	$\min 45 \text{ N/mm}^2$	ISO 6259
Resistance to Internal Pressure 20°C	42MPa/1hour	EN921
Vicat Softening	$\geq 80^\circ\text{C}$	EN721
Longitudinal Reversion	Maximum 5%	EN743
Dichloromethane Acid Resistance	No Attack	EN580
Socket strength dia $\leq 90 \text{ mm}$	4.2 x [PN]	EN921
Socket strength dia $\geq 90 \text{ mm}$	3.6 x [PN]	EN921

### Pressure Derating Factors (20-45°C) EN1452

Temp C	Derating Factor
20°	1.00
25°	1.00
30°	0.90
35°	0.80
40°	0.70
45°	0.60



Al Sowwah Island, Abu Dhabi

# uPVC Pressure Pipe System

Cold Potable Water

Pressure Pipe System  
American Standard

## ASTM D 1785 Schedule 40 / Schedule 80

Nominal Pipe Size Inch	Outside Diameter mm	Wall Thickness	
		Schedule 40 mm	Schedule 80 mm
½	21.3	2.8	3.7
¾	26.7	2.9	3.9
1	33.4	3.4	4.5
1 ¼	42.2	3.6	4.8
1 ½	48.3	3.7	5.1
2	60.3	3.9	5.5
2 ½	73.0	5.2	7.0
3	88.9	5.5	7.6
4	114.3	6.0	8.6
6	168.3	7.1	11.0
8	219.1	8.2	12.7
10	273.1	9.3	15.1
12	323.9	10.3	17.5
14	355.6	11.1	19.1
16	406.4	12.7	21.4

## ASTM D 2241 Class 100 / Class 125 / Class 160 / Class 200 / Class 315

Nominal Pipe Size Inch	Outside Diameter mm	Wall Thickness				
		SDR-41 100psi mm	SDR-32.5 125psi mm	SDR-26 160psi mm	SDR-21 200psi mm	SDR-13.5 315psi mm
½	21.3	-	-	-	-	1.6
¾	26.7	-	-	-	1.5	2.0
1	33.4	-	-	1.5	1.6	2.5
1 ¼	42.2	-	1.5	1.6	2.0	3.1
1 ½	48.3	-	1.5	1.9	2.3	3.6
2	60.3	-	1.9	2.3	2.9	4.5
2 ½	73.0	-	2.2	2.8	3.5	5.4
3	88.9	2.2	2.7	3.4	4.2	6.6
4	114.3	2.8	3.5	4.4	5.4	8.5
6	168.3	4.1	5.2	6.5	8.0	12.5
8	219.1	5.3	6.7	8.4	10.4	-
10	273.1	6.6	8.4	10.5	13.0	-
12	323.9	7.9	9.9	12.5	15.4	-
14	355.6	8.7	10.9	13.7	16.9	-
16	406.4	9.9	12.5	15.6	19.3	-

### BS 3505

Nominal Size	Outside Diameter		Wall Thickness					
			CLASS C (9 Bar)		CLASS D (12 Bar)		CLASS E (15 Bar)	
Inch.	Min. mm	Max. mm	Min. mm	Max. mm	Min. mm	Max. mm	Min. mm	Max. mm
½	21.2	21.5	-	-	-	-	1.7	2.1
¾	26.6	26.9	-	-	-	-	1.9	2.5
1	33.4	33.7	-	-	-	-	2.2	2.7
1 ¼	42.1	42.4	-	-	2.2	2.7	2.7	3.2
1 ½	48.1	48.4	-	-	2.5	3.0	3.1	3.7
2*	60.2	60.5	2.5	3.0	3.1	3.7	3.9	4.5
2 ½	75.0	75.30	3.0	3.5	3.9	4.5	4.8	5.5
3*	88.7	89.1	3.5	4.1	4.6	5.3	5.7	6.6
4*	114.1	114.5	4.5	5.2	6.0	6.9	7.3	8.4
5	140.0	140.4	5.5	6.4	7.3	8.4	9.0	10.4
6*	168.0	168.5	6.6	7.6	8.8	10.2	10.8	12.5
8*	218.8	219.4	7.8	9.0	10.3	11.9	12.6	14.5
10*	272.6	273.4	9.7	11.2	12.8	14.8	15.7	18.1
12*	323.4	324.3	11.5	13.3	15.2	17.5	18.7	21.6
14	355.0	356.0	12.6	14.5	16.7	19.2	20.5	23.6
16*	405.9	406.9	14.5	16.7	19.0	21.9	23.4	27.0

\*Available in Rubber Ring

### EN 1452-2:2009 Inch Series

Nominal Size	Outside Diameter		Nominal Wall Thickness					
			PN 9		PN 12		PN 15	
Inch.	Min. mm	Max. mm	Min. mm	Max. mm	Min. mm	Max. mm	Min. mm	Max. mm
½	21.2	21.5	-	-	-	-	1.7	2.1
¾	26.6	26.9	-	-	-	-	1.9	2.5
1	33.4	33.7	-	-	-	-	2.2	2.8
1 ¼	42.1	42.4	-	-	2.2	2.7	2.7	3.3
1 ½	48.1	48.4	-	-	2.5	3.0	3.1	3.7
2*	60.2	60.5	2.5	3.0	3.1	3.7	3.9	4.5
3*	88.7	89.1	3.5	4.1	4.6	5.3	5.7	6.6
4*	114.1	114.5	4.5	5.2	6.0	6.9	7.3	8.4
6*	168.0	168.5	6.6	7.6	8.8	10.2	10.8	12.5
8*	218.8	219.4	7.8	9.0	10.3	11.9	12.6	14.5
10*	272.6	273.4	9.7	11.2	12.8	14.8	15.7	18.1
12*	323.4	324.3	11.5	13.3	15.2	17.5	18.7	21.6
16*	405.9	406.9	14.5	16.7	19.0	21.9	23.4	27.0

\*Available in Rubber Ring

# uPVC Pressure Pipe System

For Water Distribution

Pressure Pipe System  
Metric Range

## EN ISO 1452-2:2009 Metric Series

Nominal Outside Diameter mm.	Nominal (minimum) Wall Thickness					
	Series 16 SDR 33	Series 12.5 SDR 26	Series 10 SDR 21	Series 8 SDR 17	Series 6.3 SDR 13.6	Series 5 SDR 11
	Nominal Pressure PN based on service (design) coefficient C=2.5.					
	PN6	PN8	PN10	PN12.5	PN16	PN20
20	-	-	-	-	1.5	1.9
25	-	-	-	1.5	1.9	2.3
32	-	1.5	1.6	1.9	2.4	2.9
40	1.5	1.6	1.9	2.4	3.0	3.7
50	1.6	2.0	2.4	3.0	3.7	4.6
63*	2.0	2.5	3.0	3.8	4.7	5.8
75*	2.3	2.9	3.6	4.5	5.6	6.8
90*	2.8	3.5	4.3	5.4	6.7	8.2

	Nominal Pressure PN based on service (design) coefficient C=2.0						
	Series 20 SDR 41	Series 16 SDR 33	Series 12.5 SDR 26	Series 10 SDR 21	Series 8 SDR 17	Series 6.3 SDR 13.6	Series 5 SDR 11
	PN 6	PN 8	PN 10	PN 12.5	PN 16	PN 20	PN 25
110*	2.7	3.4	4.2	5.3	6.6	8.1	10.0
125	3.1	3.9	4.8	6.0	7.4	9.2	11.4
140	3.5	4.3	5.4	6.7	8.3	10.3	12.7
160*	4.0	4.9	6.2	7.7	9.5	11.8	14.6
200*	4.9	6.2	7.7	9.6	11.9	14.7	18.2
225*	5.5	6.9	8.6	10.8	13.4	16.6	-
250*	6.2	7.7	9.6	11.9	14.8	18.4	-
280	6.9	8.6	10.7	13.4	16.6	20.5	-
315*	7.7	9.7	12.1	15.0	18.7	23.2	-
400*	9.8	12.3	15.3	19.1	23.7	29.4	-
500	12.3	-	-	-	-	-	-



Shams Al Reem Island, Abu Dhabi

### EN ISO 4422-2:1996

Nominal Outside Diameter mm.	Nominal (minimum) Wall thickness Based on service (design) coefficient of C=2.5						
	Series16.7 SDR 34.4 PN 6	Series16 SDR 33 PN 6.3	Series 12.5 SDR 26 PN 8	Series10 SDR 21 PN 10	Series8 SDR 17 PN 12.5	Series 6.3 SDR 13.6 PN 16	Series4 SDR 9 PN 25
20	-	-	-	-	-	1.5	2.3
25	-	-	-	-	1.5	1.9	2.8
32	-	-	-	1.6	1.9	2.4	3.6
40	-	1.5	1.6	1.9	2.4	3.0	4.5
50	-	1.6	2.0	2.4	3.0	3.7	5.6
63*	1.9	2.0	2.5	3.0	3.8	4.7	7.1
75*	2.2	2.3	2.9	3.6	4.5	5.6	8.4
90*	2.7	2.8	3.5	4.3	5.4	6.7	10.1

	Nominal (minimum) Wall thickness Based on service (design) coefficient of C=2.0							
		Series 20 SDR 41 PN 6.3	Series16 SDR 33 PN 8	Series 12.5 SDR 26 PN 10	Series10 SDR 21 PN 12.5	Series8 SDR 17 PN 16	Series 6.3 SDR 13.6 PN 20	Series 5 SDR 11 PN 25
110*		2.7	3.4	4.2	5.3	6.6	8.1	10.0
125		3.1	3.9	4.8	6.0	7.4	9.2	11.4
140		3.5	4.3	5.4	6.7	8.3	10.3	12.7
160*		4.0	4.9	6.2	7.7	9.5	11.8	14.6
200*		4.9	6.2	7.7	9.6	11.9	14.7	18.2
225*		5.5	6.9	8.6	10.8	13.4	16.6	-
250*		6.2	7.7	9.6	11.9	14.8	18.4	-
280		6.9	8.6	10.7	13.4	16.6	20.5	-
315*		7.7	9.7	12.1	15.0	18.7	23.2	-
355		8.7	10.9	13.6	16.9	21.1	26.1	-
400*		9.8	12.3	15.3	19.1	23.7	29.4	-
450		11.0	13.8	17.2	21.5	26.7	33.1	-

\*Available in Rubber Ring

### ISO 161/1

Nominal Outside Diameter mm.	Nominal (minimum) Wall Thickness				
	Series 20 SDR41 PN 6.3	Series 12.5 SDR 26 PN 10	Series 8 SDR 17 PN 16	Series 6.3 SDR 13.6 PN 20	Series 5 SDR 11 PN 25
20	-	-	1.2	1.5	1.9
25	-	-	1.5	1.9	2.3
32	-	1.3	1.9	2.4	2.9
40	-	1.6	2.4	3.0	3.7
50	1.3	2.0	3.0	3.7	4.6
63*	1.6	2.5	3.8	4.7	5.8
75*	1.9	2.9	4.5	5.6	6.8
90*	2.2	3.5	5.4	6.7	8.2
110*	2.7	4.2	6.6	8.1	10.0
125	3.1	4.8	7.4	9.2	11.4
140	3.5	5.4	8.3	10.3	12.7
160*	4.0	6.2	9.5	11.8	14.6
200*	4.9	7.7	11.9	14.7	18.2
225*	5.5	8.6	13.4	16.6	20.5
250*	6.2	9.6	14.8	18.4	22.7
280	6.9	10.7	16.6	20.6	25.4
315*	7.7	12.1	18.7	23.2	28.6
355	8.7	13.6	21.1	26.1	32.3
400*	9.8	15.3	23.7	29.4	36.3
450	11.0	17.2	26.7	33.1	40.9

\*Available in Rubber Ring

# uPVC Pressure Pipe System

## For Water Distribution

Pressure Pipe System  
Metric Range

DIN 8062:2009

Nominal Outside Diameter mm.	Nominal (minimum) Wall Thickness							
	Nominal Pressure PN based on safety factor (SF)=2.5							
	Series 25 SDR51 PN 4	Series 16.7 SDR 34.4 PN 6	Series 12.5 SDR 26 PN 8	Series 10 SDR 21 PN 10	Series 8 SDR 17 PN 12.5	Series 6.3 SDR 13.6 PN 16	Series 5 SDR 11 PN 20	Series 4 SDR 9 PN 25
20	-	-	-	-	-	1.5	1.9	2.3
25	-	-	-	-	1.5	1.9	2.3	2.8
32	-	-	-	1.6	1.9	2.4	2.9	3.6
40	-	-	1.6	1.9	2.4	3.0	3.7	4.5
50	-	1.5	2.0	2.4	3.0	3.7	4.6	5.6
63*	-	1.9	2.5	3.0	3.8	4.7	5.8	7.1
75*	1.5	2.2	2.9	3.6	4.5	5.6	6.8	8.4
90*	1.8	2.7	3.5	4.3	5.4	6.7	8.2	10.1
110*	2.2	3.2	4.2	5.3	6.6	8.1	10.0	12.3
125	2.5	3.7	4.8	6.0	7.4	9.2	11.4	14.0
140	2.8	4.1	5.4	6.7	8.3	10.3	12.7	15.7
160*	3.2	4.7	6.2	7.7	9.5	11.8	14.6	17.9
200*	3.9	5.9	7.7	9.6	11.9	14.7	18.2	22.4
225*	4.4	6.6	8.6	10.8	13.4	16.6	20.5	25.2
250*	4.9	7.3	9.6	11.9	14.8	18.4	22.7	27.9
280	5.5	8.2	10.7	13.4	16.6	20.6	25.4	31.3
315*	6.2	9.2	12.1	15.0	18.7	23.2	28.6	-
400*	7.9	11.7	15.3	19.1	23.7	29.4	-	-
500	9.8	14.6	-	-	-	-	-	-

\*Available in Rubber Ring

Nominal Outside Diameter mm.	Nominal (minimum) Wall Thickness						
	Nominal Pressure PN based on safety factor (SF)=2.0						
	Series 25 SDR51 PN 5	Series 20 SDR 41 PN 6	Series 12.5 SDR 26 PN 10	Series 10 SDR 21 PN 12.5	Series 8 SDR 17 PN 16	Series 6.3 SDR 13.6 PN 20	Series 5 SDR 11 PN 25
20	-	-	-	-	1.2	1.5	1.9
25	-	-	-	-	1.5	1.9	2.3
32	-	-	-	-	1.9	2.4	2.9
40	-	-	1.6	1.9	2.4	3.0	3.7
50	-	1.3	2.0	2.4	3.0	3.7	4.6
63*	-	1.6	2.5	3.0	3.8	4.7	5.8
75*	1.5	1.9	2.9	3.6	4.5	5.6	6.8
90*	1.8	2.2	3.5	4.3	5.4	6.7	8.2
110*	2.2	2.7	4.2	5.3	6.6	8.1	10.0
125	2.5	3.1	4.8	6.0	7.4	9.2	11.4
140	2.8	3.5	5.4	6.7	8.3	10.3	12.7
160*	3.2	4.0	6.2	7.6	9.5	11.8	14.6
200*	3.9	4.9	7.7	9.5	11.9	14.7	18.2
225*	4.4	5.5	8.6	10.7	13.4	16.6	20.5
250*	4.9	6.2	9.6	11.9	14.8	18.4	22.7
280	5.5	6.9	10.7	13.3	16.6	20.6	25.4
315*	6.2	7.7	12.1	15.0	18.7	23.2	28.6
400*	7.9	9.8	15.3	19.0	23.7	29.4	36.3
500	9.8	12.3	-	-	-	-	-

\*Available in Rubber Ring



## British Standard Telephone Duct (B.P.O.)

Size (mm)	Minimum	
	OD (mm)	Wall (mm)
Duct 56	53.90	1.55
Duct 54D	96.50	3.25

Pipes can be supplied in 6.07 and 6.1m as per the standard or 6m length if required.

## BS 3506

Nominal Size	Outside Diameter		Wall Thickness		
			Class O (non pressure)		
			Average Value	Individual Value	
Inch	Min. mm	Max. mm	mm	Min. mm	Max. mm
1 <sup>1</sup> / <sub>2</sub>	48.1	48.4	2.2	1.8	2.2
2	60.2	60.5	2.2	1.8	2.2
3	88.7	89.1	2.2	1.8	2.2
4	114.1	114.5	2.8	2.3	2.8
6	168.0	168.5	3.7	3.1	3.7
8	218.8	219.4	3.7	3.1	3.7
10	272.6	273.4	3.7	3.1	3.7
12	323.4	324.3	3.7	3.1	3.7
16	405.9	406.9	4.8	4.1	4.8



Water Park Yas Island, Abu Dhabi

# Duct and Conduit

For use in electrical, telephone, communication and other duct systems

Duct and Conduit  
UL 651 Listed

## Duct and Conduit UL 651 Listed

National Plastics produces a range of upvc schedule 40 ducts in sizes 1/2" to 6" that are in accordance with NEMA TC-2A standard and listed to UL 651.

The conduits are suitable for above or below ground installations and made from 100% virgin pvc resin. The ducts meet and exceed all the mechanical and performance requirement of both the NEMA TC2 and UL 651 standards.

### General Properties

- Fully compliant to NEMA TC-2 and UL 651
- Rated for use with 90°C conductors
- Ultraviolet protected
- High impact and deformation properties
- Solvent cement joints with deep sockets
- Can be supplied in various lengths such as 3m, 6m, 2.9m, 5.8m (standard leg lengths 3m, 6m)
- Smooth solid wall
- Produced under an ISO 9001:2008 Quality Assurance System

### MECHANICAL PROPERTIES

	ASTM	TYPICAL VALUE
Specific Gravity	D792	1.4 - 1.7
Tensile Strength (psi) @ 73.4 °F	D638	5,000
Izod Impact - ft lbs/in of notch	D256	0.65 - 1.50
Flexural Strength (psi)	D790	12,500
Comprehensive Strength (psi)	D695	9,000
Hardness (Durometer D)	D2240	95

### THERMAL PROPERTIES

	ASTM	TYPICAL VALUE
Coefficient of Thermal Expansion - in/in/ °C	D696	$5.13 \times 10^{-5}$
Coefficient of Thermal Expansion - in/in/ °F	D696	$3.0 \times 10^{-5}$
Deflection Temp. °F Under Load @ 264 psi	D648	140 °F
Thermal Conductivity BTU (hr) (ft) (°F/in)	C177	1.3

### ELECTRICAL PROPERTIES

	ASTM	TYPICAL VALUE
Dielectric Strength - volts/mil	D149	1,100
Dielectric Constant 60 CPS @ 30 °C	D150	4.00
Power Factor 60 CPS @ 30 °C	D150	1.93

### FIRE RESISTANCE PROPERTIES

	ASTM	TYPICAL VALUE
Fire Resistance	-	Self Extinguishing
Flame Spread	E162	10
Smoke Development	E84	330

## NEMA TC-2 AND ANSI / UL651 Sizes and Dimensions of PVC Conduit

U.S. Customary Units				
Nominal Size Inches	Outside Diameter, In. Average	Wall Thickness, Inches EPC-40-PVC		Socket Insertion Depth Inches
		Maximum	Minimum	
1 1/4	1.660±0.005	0.160	0.140	15/16 - 2
1 1/2	1.900±0.006	0.165	0.145	1 1/6 - 2
2	2.375±0.006	0.174	0.154	1 1/8 - 2
2 1/2	2.875±0.007	0.227	0.203	1 1/2 - 3
3	3.500±0.008	0.242	0.216	1 5/8 - 3 1/8
3 1/2	4.000±0.008	0.253	0.226	1 11/16 - 3 1/4
4	4.500±0.009	0.265	0.237	1 3/4 - 3 3/8
5	5.563±0.010	0.289	0.258	1 15/16 - 3 5/8
6	6.625±0.011	0.314	0.280	2 1/8 - 3 3/4

Metric Units				
Nominal Size Inches	Outside Diameter, mm Average	Wall Thickness, Millimeters EPC-40-PVC		Socket Insertion Depth mm
		Maximum	Minimum	
1 1/4	42.15±0.13	4.06	3.56	23.8 - 50.8
1 1/2	48.26±0.15	4.19	3.68	27.0 - 50.8
2	60.32±0.15	4.42	3.91	28.6 - 50.8
2 1/2	73.02±0.18	5.77	5.16	38.1 - 76.2
3	88.90±0.20	6.15	5.49	41.3 - 79.4
3 1/2	101.60±0.20	6.43	5.74	42.9 - 82.6
4	114.30±0.23	6.73	6.02	44.5 - 85.7
5	141.30±0.25	7.34	6.55	49.2 - 92.1
6	168.28±0.28	7.98	7.11	54.0 - 95.3

## UL 651 LISTED PVC CONDUIT

Bends SCH 40 Sizes 1 1/4" - 6"

- Available in 22 1/2°, 30°, 45° and 90° angles
- Available in different radius length (R)



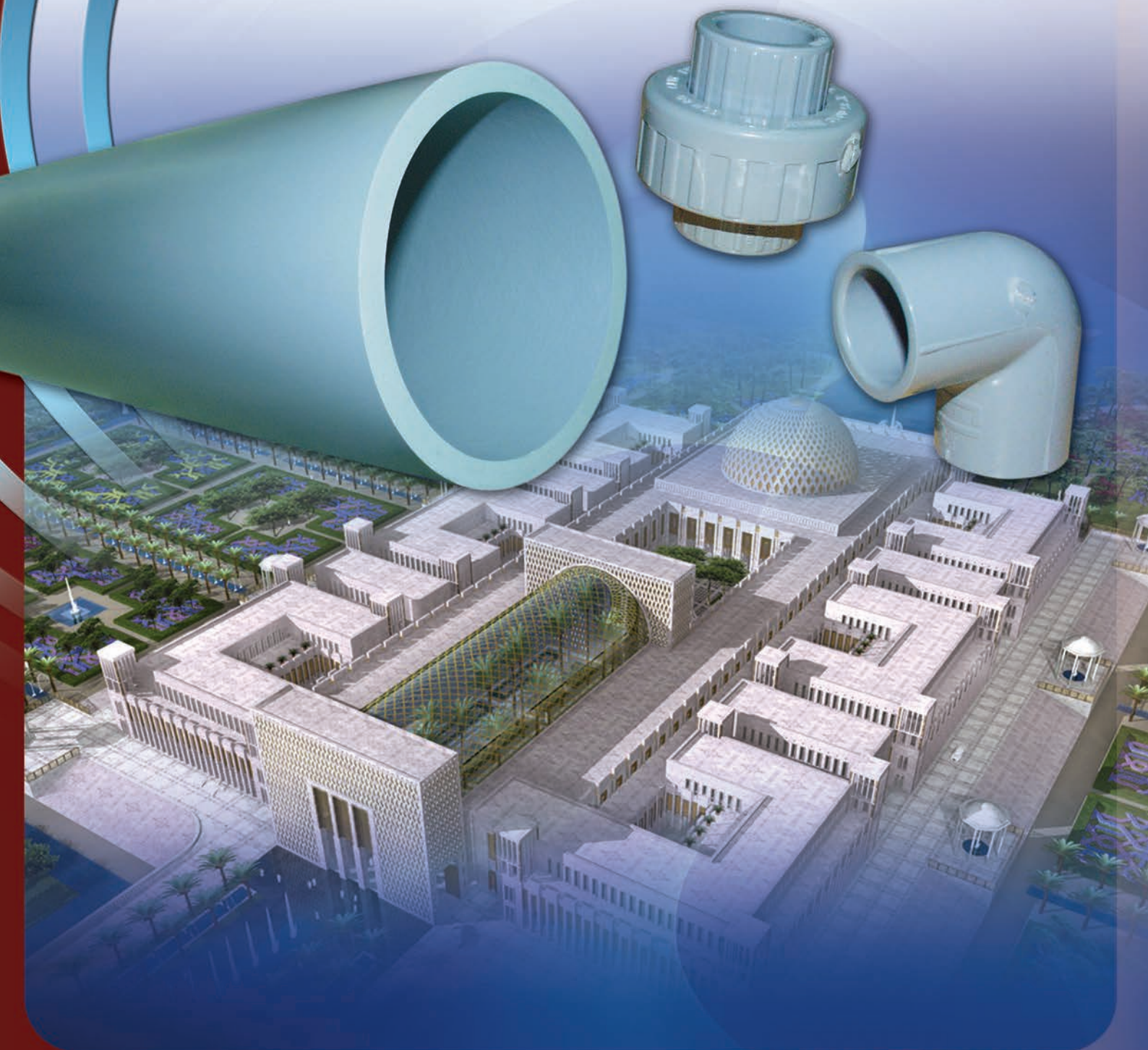
### Radius Length (R)

18"	48"
24"	60"
36"	

\* 18" radius not available on 4" and above

# CPVC Pipe System

Hot and Cold Water Distribution



## What is cPVC?

Chlorinated Polyvinyl Chloride (CPVC) is chlorinated Pvc and has become an important engineering thermoplastic due to its relatively low cost, high heat distortion temperature, chemical inertness, and outstanding mechanical, dielectric, flame and smoke properties.

CPVC is produced by National Plastic Sharjah. A full range of CPVC pipes are produced according to American Standards (ASTM F441) and Metric Standards (DIN 8079 / 8080).

### Benefits of CPVC

CPVC is the most superior plastic alternative to Polypropylene, PEX, Polyethylene and other plastic and much more superior to metal alternatives with respect to.

- Heat resistance upto 90°C
- Chemical resistance over a broad temperature range
- Long term proven service performance of more than 50 years
- Lower installed cost
- Suitable for potable water and can be produced with NSF or WRAS approved grade
- Does not sustain burning



**CPVC**  
- initially when torch is applied



**Other Plastics**  
- initially when torch is applied



**CPVC**  
- After torch is removed



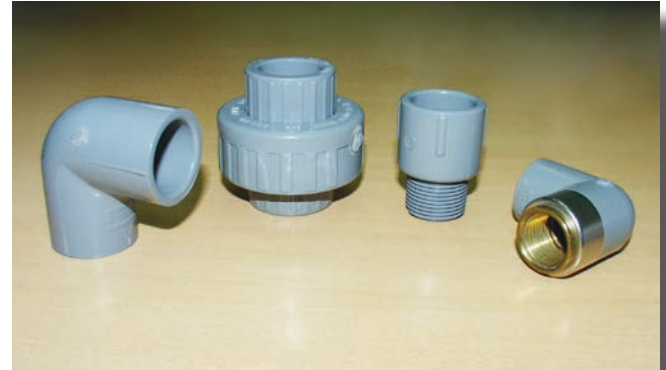
**Other Plastics**  
- After torch is removed

# CPVC Pipe System

CPVC Pipe System  
Hot & Cold Water Distribution

## CPVC advantage over Polypropylene

- Same flow rate with smaller pipe size
- Ease of installation (overhead lines, confined spaces)
- No need for expensive electrical tools and source
- Lower thermal expansion
- Wider support spacing, less "looping" of pipe
- Less heat loss
- Chemical resistance to acids and alkalis
- Low bacteria build up
- No oxygen permeation to corrode metal components
- Low flame spread
- Low smoke generation
- Self-extinguishing
- No flaming drips



## Fittings / Valves

National Plastic can supply a full range of CPVC fittings and valves with the pipe to provide a complete system. ASTM standard fittings are from Spears USA to ASTM F438 / F439 in Schedule 40 and Schedule 80. DIN Standard fittings are from FIP Italy to DIN 8079 / 8080, EN ISO 15493 PN16.

## Solvent Cement

In addition National Plastic recommends that IPS WELDON 724 to be used for all solvent cement application. This is a special grade cement and ensures that the system will perform for many years.



Presidential Palace, Abu Dhabi

## CPVC Pipe Dimensions and Pressure Rating - ASTM F441

Schedule 80

Nominal Pipe Size	Minimum		Ave ID	Maximum Water P
	OD	Wall		
(in)	(in)	(in)	(in)	@73°F
½"	0.840	0.147	0.528	850
¾"	1.050	0.154	0.724	690
1"	1.315	0.179	0.935	630
1 ¼"	1.660	0.191	1.256	520
1 ½"	1.900	0.200	1.476	470
2"	2.375	0.218	1.913	400
2 ½"	2.875	0.276	2.289	420
3"	3.500	0.300	2.864	370
4"	4.500	0.337	3.786	320
6"	6.625	0.432	5.709	280
8"	8.625	0.500	7.565	250
10"	10.750	0.593	9.492	230
12"	12.750	0.687	11.294	230

Schedule 40

Nominal Pipe Size	Minimum		Ave ID	Maximum Water P
	OD	Wall		
(in)	(in)	(in)	(in)	@73°F
½"	0.840	0.109	0.608	600
¾"	1.050	0.113	0.810	480
1"	1.315	0.133	1.033	450
1 ¼"	1.660	0.140	1.364	370
1 ½"	1.900	0.145	1.592	330
2"	2.375	0.154	2.049	280
2 ½"	2.875	0.203	2.445	300
3"	3.500	0.216	3.042	260
4"	4.500	0.237	3.998	220
6"	6.625	0.280	6.031	180
8"	8.625	0.322	7.943	160
10"	10.750	0.365	9.976	140
12"	12.750	0.406	11.890	130

CPVC DIN8079 / 8080  
Table of Dimensions

Wall Thickness "s"	
Outside Diameter "d" mm	SDR 13.6 S6.3 PN16 mm
16	1.4
20	1.5
25	1.9
32	2.4
40	3.0
50	3.7
63	4.7
75	5.6
90	6.7
110	8.2
160	11.8

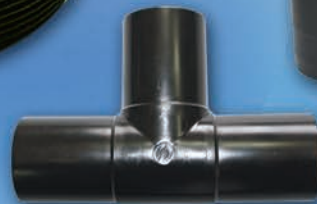
Allowable Working Pressure  
for 50 years design life

Operating Temperature		Factors CPVC
°F	°C	
70	21	1.00
80	27	0.96
90	32	0.92
100	38	0.85
110	43	0.77
115	46	0.74
120	49	0.70
125	52	0.66
130	54	0.62
140	60	0.55
150	66	0.47
160	71	0.40
170	77	0.32
180	82	0.25
200	93	0.18



# Polyethylene Pipe System

Irrigation and Water Distribution



ISO 4427 : 1996, DIN 8074, EN 12201 HDPE  
DIN 8072 LLDPE • ASAE S435 LLDPE

AUST STD 2698-1 : 1984 LLDPE • BS 1972 / 67 LDPE

## The Polyethylene Difference

National Plastics PE pipes are made from 100% virgin polyethylene and only contain UV stabilizers and pigments necessary for the pipes to conform to the specifications. Pipes contain minimum of 2.5% carbon black. All pipes are black in color for maximum UV resistance and suitable for drinking water and potable water supplies.

National Plastic pipes are produced in HDPE, LLDPE and LDPE material. HDPE pipes are produced in a number of design stresses against the standards ISO, DIN, EN and have a design coefficient "C" of not less than 1.25 to the MRS of the material as set out in Table 1 and Table 2.

HDPE pipes can be produced in PE63, PE80 or PE100 material.



**Table 1 : Designation of Material**

Designation of material	MRS at 50 years and 20 °C MPa	Maximum allowable hydrostatic design stress, $\sigma_s$ MPa
PE 100	10	8
PE 80	8	6.3
PE 63	6.3	5
PE 40	4	3.2
PE 32	3.2	2.5

The relationship between MRS and  $\sigma_s$  for various design coefficients is given in Table 2.

**Table 2 : Relationship between MRS,  $\sigma_s$  and design coefficient C at 20°C**

Hydrostatic design stress of pipe, $\sigma_s$ MPa	Minimum required strength of material MPa				
	10	8	6.3	4	3.2
	Design coefficient, C				
8	1.25	-	-	-	-
6.3	1.6	1.25	-	-	-
5	2	1.6	1.25	-	-
4	2.5	2	1.6	-	-
3.2	3.2	2.5	2	1.25	-
2.5	-	3.2	2.5	1.6	1.25

# Polyethylene Pipe System

For Water Distribution

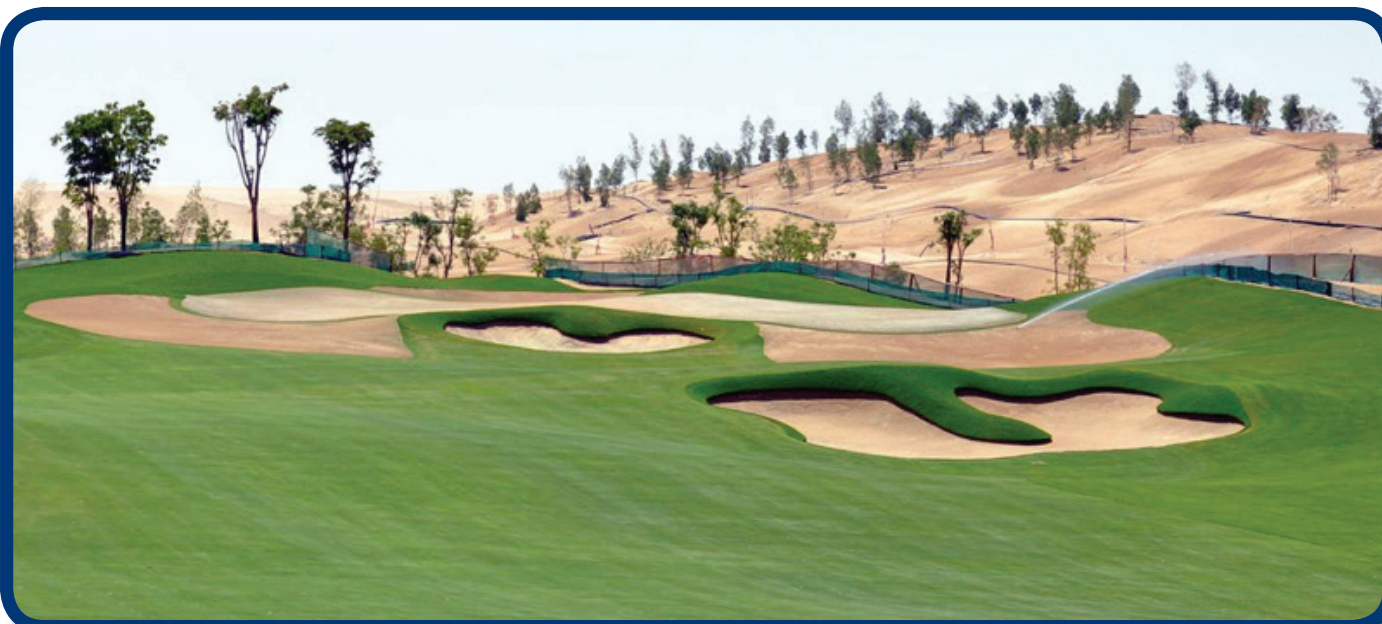
Polyethylene Pipe System  
Irrigation & Water Distribution

ISO 4427 : 1996, DIN 8074, EN 12201

Pipes of High Density Polyethylene (HDPE)

Polyethylene pipes with a design stress  $\sigma_s$  of 5 MPa (PE63)

Nominal Outside Diameter  $d_n$	Pipe series <sup>1)</sup>							
	S 16	S 12,5	S 8,3	S 8	S 6,3	S 5	S 4	S 3,2
	Standard dimension ratio							
	SDR 33	SDR 26	SDR 17,6	SDR 17	SDR 13,6	SDR 11	SDR 9	SDR 7,4
	Nominal pressure PN <sup>2)</sup> for $\sigma_s = 5 \text{ MPa}$							
	PN 3,2	PN 4	PN 6	PN 6,3	PN 8	PN 10	PN 12,5	PN 16
	Nominal wall thickness, $e_n$ mm							
16	-	-	-	-	-	2.3	2.3	2.3
20	-	-	-	-	2.3	2.3	2.3	2.8
25	-	-	2.3	2.3	2.3	2.3	2.8	3.5
32	-	-	2.3	2.3	2.4	2.9	3.6	4.4
40	-	2.3	2.3	2.4	3.0	3.7	4.5	5.5
50	-	2.3	2.9	3.0	3.7	4.6	5.6	6.9
63	2.3	2.5	3.6	3.8	4.7	5.8	7.1	8.6
75	2.3	2.9	4.3	4.5	5.6	6.8	8.4	10.3
90	2.8	3.5	5.1	5.4	6.7	8.2	10.1	12.3
110	3.4	4.2	6.3	6.6	8.1	10.0	12.3	15.1
125	3.9	4.8	7.1	7.4	9.2	11.4	14.0	17.1
140	4.3	5.4	8.0	8.3	10.3	12.7	15.7	19.2
160	4.9	6.2	9.1	9.5	11.8	14.6	17.9	21.9
180	5.5	6.9	10.2	10.7	13.3	16.4	20.1	24.6
200	6.2	7.7	11.4	11.9	14.7	18.2	22.4	27.4
225	6.9	8.6	12.8	13.4	16.6	20.5	25.2	30.8
250	7.7	9.6	14.2	14.8	18.4	22.7	27.9	34.2
280	8.6	10.7	15.9	16.6	20.6	25.4	31.3	38.3
315	9.7	12.1	17.9	18.7	23.2	28.6	35.2	43.1
355	10.9	13.6	20.1	21.1	26.1	32.2	39.7	48.5
400	12.3	15.3	22.7	23.7	29.4	36.3	44.7	54.7



Al Ruwaya Tiger Woods Golf Course, Dubai

# ISO 4427 : 1996, DIN 8074, EN 12201

## Pipes of High Density Polyethylene (HDPE)

Polyethylene pipes with a design stress  $\sigma_s$  of 6.3 MPa (PE80)

Nominal Outside Diameter  $d_n$	Pipe series <sup>1)</sup>				
	S 10	S 8	S 6,3	S 5	S 4
	Standard dimension ratio				
	SDR 21	SDR 17	SDR 13,6	SDR 11	SDR 9
	Nominal pressure PN <sup>2)</sup> for $\sigma_s = 6,3 \text{ MPa}$				
	PN 6 <sup>3)</sup>	PN 8	PN 10	PN 12,5	PN 16
	Nominal wall thickness, $e_n$ mm				
16	-	-	-	-	2.3
20	-	-	-	-	2.3
25	-	-	-	2.3	2.8
32	-	-	-	3.0	3.6
40	-	-	-	3.7	4.5
50	-	-	-	4.6	5.6
63	-	-	4.7	5.8	7.1
75	-	4.5	5.6	6.8	8.4
90	4.3	5.4	6.7	8.2	10.1
110	5.3	6.6	8.1	10.0	12.3
125	6.0	7.4	9.2	11.4	14.0
140	6.7	8.3	10.3	12.7	15.7
160	7.7	9.5	11.8	14.6	17.9
180	8.6	10.7	13.3	16.4	20.1
200	9.6	11.9	14.7	18.2	22.4
225	10.8	13.4	16.6	20.5	25.2
250	11.9	14.8	18.4	22.7	27.9
280	13.4	16.6	20.6	25.4	31.3
315	15.0	18.7	23.2	28.6	35.2
355	16.9	21.1	26.1	32.2	39.7
400	19.1	23.7	29.4	36.3	44.7

Polyethylene pipes with a design stress  $\sigma_s$  of 8 MPa (PE100)

Nominal Outside Diameter  $d_n$	Pipe series <sup>1)</sup>		
	S 8	S 6,3	S 5
	Standard dimension ratio		
	SDR 17	SDR 13,6	SDR 11
	Nominal pressure PN <sup>2)</sup> for $\sigma_s = 8 \text{ MPa}$		
	PN 10	PN 12,5	PN 16
	Nominal wall thickness, $e_n$ mm		
32	-	-	3.0
40	-	-	3.7
50	-	-	4.6
63	-	4.7	5.8
75	4.5	5.6	6.8
90	5.4	6.7	8.2
110	6.6	8.1	10.0
125	7.4	9.2	11.4
140	8.3	10.3	12.7
160	9.5	11.8	14.6
180	10.7	13.3	16.4
200	11.9	14.7	18.2
225	13.4	16.6	20.5
250	14.8	18.4	22.7
280	16.6	20.6	25.4
315	18.7	23.2	28.6
355	21.1	26.1	32.2
400	23.7	29.4	36.3

# Polyethylene Pipe System

## For Water Distribution

Polyethylene Pipe System  
Irrigation & Water Distribution

### DIN 8072

#### Pipes of Low Density Polyethylene (LLDPE)

Outside Diameter (mm)	Wall Thickness		
	2.5 Bar Rating (mm)	6 Bar Rating (mm)	10 Bar Rating (mm)
10	-	-	2.0
12	-	-	2.0
16	-	2.0	2.7
20	-	2.2	3.4
25	2.0	2.7	4.2
32	2.0	3.5	5.4
40	2.0	4.3	6.7
50	2.4	5.4	8.4
63	3.0	6.8	10.5
75	3.6	8.1	12.5
90	4.3	9.7	15.0
110	5.3	11.8	18.4



Madinat Jumeirah, Dubai

## ASAE S435

### ASTM Standard Linear Low Density Drip Irrigation Tubing (LLDPE)

Ordering Code	Nominal Inside Diameter		Minimum Inside Diameter		Minimum Wall Thickness		Nominal Working Pressure	
	in	mm	in	mm	in	mm	Psi	Bar
DP15670D(112)	½	13	0.617	15.67	0.044	1.12	69	4.8
DP17960D(124)	½	15	0.707	17.96	0.049	1.24	67	4.6
DP18110D(107)	½	16	0.713	18.11	0.042	1.07	57	3.9
DP20900D(119)	¾	18	0.823	20.90	0.047	1.19	55	3.8
DP23440D(132)	¾	21	0.923	23.44	0.052	1.32	64	3.7
DP30020D(157)	1	27	1.180	30.02	0.062	1.57	50	3.4

## AUST STD 2698-1 : 1984

### Australian Standard Linear Low Density Drip Irrigation Tubing (LLDPE)

Ordering Code	Nominal Inside Diameter		Minimum Inside Diameter		Minimal Wall Thickness		Nominal Working Pressure		Coil Size Meters
	in	mm	in	mm	in	mm	Psi	Bar	
DP13(12)	½	13	0.50	12.7	0.047	1.2	44	3.0	250mtrs.
DP13(15)	½	13	0.50	12.7	0.059	1.5	60	4.0	250mtrs.
DP16(12)	½	16	0.62	15.8	0.047	1.2	44	3.0	250mtrs.
DP19(13)	¾	19	0.74	18.90	0.051	1.3	44	3.0	250mtrs.
DP25(15)	1	25	1.00	25.20	0.059	1.5	44	3.0	250mtrs.
DP32(2.0)	1 ¼	32	1.24	31.50	0.078	2.0	44	3.0	250mtrs.

## BS 1972 / 67

### British Standard Low Density Polyethylene (LDPE)

Nominal pipe size inch	Outside Diameter				Wall Thickness											
	Minimum		Maximum		Class B 6.1 kgf/cm <sup>2</sup> (Bar Approx)				Class C 9.1 kgf/cm <sup>2</sup> (Bar Approx)				Class D 12.2kgf/cm <sup>2</sup> (Bar Approx)			
					Minimum		Maximum		Minimum		Maximum		Minimum		Maximum	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
3/8	0.669	17.0	0.681	17.3	-	-	-	-	0.087	2.2	0.098	2.5	0.110	2.8	0.122	3.1
½	0.835	21.2	0.847	21.5	-	-	-	-	0.106	2.7	0.118	3.0	0.134	3.4	0.146	3.7
¾	1.047	26.6	1.059	26.9	0.091	2.3	0.102	2.6	0.134	3.4	0.146	3.7	0.169	4.3	0.185	4.7
1	1.315	33.4	1.327	33.7	0.118	3.0	0.130	3.3	0.165	4.2	0.181	4.6	0.213	5.8	0.232	5.9
1 ¼	1.657	42.1	1.673	42.5	0.146	3.7	0.161	4.1	0.209	5.3	0.228	5.8	0.268	6.7	0.295	7.5
1 ½	1.894	48.1	1.910	48.5	0.169	4.3	0.185	4.7	0.240	6.1	0.264	6.7	0.307	7.8	0.338	8.6
2	2.366	60.1	2.386	60.6	0.209	5.3	0.228	5.8	0.299	7.6	0.331	8.4	-	-	-	-
3	3.488	88.6	3.516	89.3	0.307	7.8	0.339	8.6	0.441	11.2	0.484	12.3	-	-	-	-
4	4.484	113.9	4.516	114.7	0.394	10.0	0.433	11.0	-	-	-	-	-	-	-	-

# Drainage Pipe System

British Standard



**FITTINGS RANGE : Ostendorf, Ezyflo, Redi**  
**BS EN 1329 • BS EN 1401 • BS 5255 • BS 4514**  
**BS 4660 • BS 5481**

## Drainage Pipe Systems

National Plastics produces a range of UPVC pipes for above and below ground use made from 100% virgin UPVC. It has full range of fittings in both solvent weld and rubber ring joint for all sizes.

The pipes are produced in all the major international standards ie: European Standards BS EN 1401, BS EN 1329, as well as the previous standards such as BS 5255, BS 4514, BS 4660, BS 5481. A range complying to ASTM D2655 Sch 40/80 is also available on request.

National Plastic also has Kitemark licences from BSI for the EN range from 1 1/4" to 16" and can supply Kitemark certified pipes where required.

National Plastic can provide a range of fittings from its own Ezyflo brand or from Redi and Hunter.

### General Properties of National Plastic Drain Pipes

- Fully compliant to the main International Standards
- Kitemark certified range
- Tough, impact resistant
- EPDM rubber rings following EW681 Standard
- Can be supplied in Solvent Weld or Rubber Ring Joint (from 3" and above)
- Different lengths available 3m, 2.9m, 6m, 5.8m. Other lengths on request.
- Distinctive colour coded system (ie Light Grey, Brown, White, etc.) with full printing at 1m intervals
- Superior chemical and acid resistance
- Outstanding mechanical properties of tensile strength and resistance to pressure.

## BS 5255, BS 4514, BS 4660, BS 5481

Code	Nominal OD mm(inch)	Minimum OD mm	Minimum Wall Thickness mm	Colour
<b>BS 5255 WASTE</b>				
DR-125	36(1 1/4")	36.15	1.8	WH/LG
DR-15	43(1 1/2")	42.75	1.9	"
DR-2(50)*	50(2")	50.00	2.0	"
DR-2(55)	55(2")	55.75	2.0	"
<b>BS 4514 SOIL</b>				
DR-3/LG	82(3")	82.40	3.0	LG
DR-4/LG	110(4")	110.00	3.2	"
DR-6/LG	160(6")	160.00	3.2	"
<b>BS 4660 UNDERGROUND</b>				
DR-4/BR	110(4")	110.00	3.2	BR
DR-6/BR	160(6")	160.00	4.1	"
<b>BS 5481 GRAVITY SEWER</b>				
DR-8/BR	200(8")	200.00	4.9	BR
DR-10/BR	250(10")	250.00	6.1	"
DR-12/BR	315(12")	315.00	7.7	"
DR-16/BR	400(16")	400.00	9.8	"

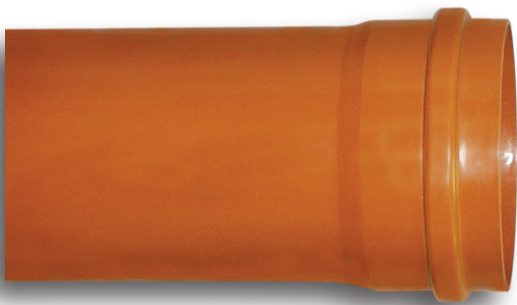
\* Not part of BS 5255. Metric only.

# UPVC Drainage Pipe System

UPVC Drainage Pipe System  
British Standard

## The main features of Ezyflo drainage fittings are:

- Strong and resistant to impact
- Easy to install and compatible with National Plastic drainage pipe.
- Fully compliant to the BS standards.
- Resistant to a wide range of chemicals / fluids.
- Smooth bore to give excellent flow characteristics.



## Specifications:

Standards	:	BS 5255 - Light Grey; BS 4514 - Light Grey; BS 4660 - Brown
Material	:	100% uPVC
Joints	:	Female solvent weld sockets
Temp Range	:	0°C - 80°C (for intermittent discharge)
Tensile Strength	:	Min. 45 N/mm <sup>2</sup>

## Characteristics of Pipes BS EN1329, BS EN1401

### Raw Material

The raw material is 100% virgin PVC-U

### Colour

BS EN 1329-1:2000 v	Light Grey
BS EN 1401-1:1998 v	Orange Brown

### Chamfering

A 15° chamfer is applied to all spigot ends for rubber ring pipe.

### Length

Pipes are normally supplied in 6m overall length.

Pipes can also be supplied in 5.8m overall length to fit inside containers.

Sizes 36, 43 and 56mm are supplied in 4m overall length with plain ends.

### Compound Characteristics

The compounds used in National Plastic pipes conforming to the standards have the following characteristics.

Modulus of Elasticity	=	E (1 min) ≥ 3000 mPa
Average Density	=	1.4 g/cm <sup>3</sup>
Average Coefficient of		
Linear Thermal Expansion	=	0.8mm/mK
Thermal Conductivity	=	0.16 WK <sup>-1</sup> m <sup>-1</sup>
Surface Resistance	=	> 10 <sup>12</sup> Ω



Dubai International Airport, Dubai

## Mechanical and Physical Characteristics

Characteristics	Requirement	Test Method
Impact Resistance	TIR ≤ 10%	EN 744
Vicat Softening	≥ 79°C	EN 727
Longitudinal Reversion	≤ 5%	EN 743
Dichloromethane Acid Resistance	No attack	EN 580
Water Tightness of Rubber Ring Joint	No leakage	EN 1277
Elevated Temp. Cycling	No leakage	EN 1055
Long Term Performance of TPE Seals	1. 90 days ≥ 1.3 bar 2. 100 years ≥ 0.6 bar	prEN 1989
Resistance to Internal Pressure	No failure during the test 10.0MPa for 1000 hours, at 60°C	EN 921

## BS EN 1329-1:2000

Dimensions in millimeters

Nominal Size DN/OD	Nominal OD	Mean Outside Diameter		Wall Thickness Application Area "B"	
		(dem, min)	(dem, max)	(e, min)	(e, max)
36 (1 1/4")	36	36.2	36.5	3.0	3.5
43 (1 1/2")	43	42.8	43.1	3.0	3.5
56 (2")	56	55.8	56.1	3.0	3.5
82 (3")	82	82.0	82.3	3.0	3.5
110 (4")	110	110.0	110.30	3.2	3.8
160 (6")	160	160.0	160.40	3.2	3.8
200 (8")	200	200.0	200.5	3.9	4.5
250 (10")	250	250.0	250.5	4.9	5.6
315 (12")	315	315.0	315.6	6.2	7.1

N.B. Application area "B" for components intended to be used above ground inside the building or outside building fixed to a wall.

## BS EN 1401-1:1998

Dimensions in millimeters

Nominal Size DN/OD	Nominal OD	Mean Outside Diameter		Wall Thickness SN2, SDR 51		Wall Thickness SN4, SDR 41		Wall Thickness SN8, SDR 34	
		(dem, min)	(dem, max)	(e, min)	(e, max)	(e, min)	(e, max)	(e, min)	(e, max)
110 (4")	110	110.0	110.3	-	-	3.2	3.8	3.2	3.8
160 (6")	160	160.0	160.4	3.2	3.8	4.0	4.6	4.7	5.4
200 (8")	200	200.0	200.5	3.9	4.5	4.9	5.6	5.9	6.7
250 (10")	250	250.0	250.5	4.9	5.6	6.2	7.1	7.3	8.3
315 (12")	315	315.0	315.6	6.2	7.1	7.7	8.7	9.2	10.4
400 (16")	400	400.0	400.7	7.9	8.9	9.8	11.0	11.7	13.1
500 (20")	500	500.0	501.5	9.8	11.0	12.3	13.8	14.6	16.3

N.B. For Outside the building structure application area "U" SN2 = Ring stiffness of 2 kN/m<sup>2</sup> SN4 = Ring stiffness of 4 kN/m<sup>2</sup>

# Acoustic Soundproof Drainage System



NATIONAL PLASTIC SHARJAH ACOUSTIC PIPE 110mmX5mm PVC-U EN14366 SDR21 23.02.2012.



## Acoustic Soundproof Drainage System

National Plastics produces a range of acoustic pipes suitable for above ground drainage systems that have been certified by the German Fraunhofer Institute IBP according to EN 14366.

The pipes are made from a special acoustic grade virgin uPVC material and consist of sizes from 40mm (1 1/4") upto 160mm (6"). Larger sizes are available on request. The pipes are metric/ISO dimensions (See Table 1) and fully compatible with the "Redi" Phono Line range of acoustic fittings. The drain pipes meet and exceed all the performance requirements of EN1329 (UPVC above ground drainage systems).

Table 1

UPVC Acoustic Pipes Drainage System  
EN 14366, DIN 4109, ISO Dimensions

Nominal Outside Diameter mm	Nominal (min) Wall Thickness mm
40	3.0
50	3.0
75	4.0
90	4.5
110	5.0
125	5.0
160	5.5

N.B. Pipes can be supplied in 3m or 6m lengths.  
Sockets Solvent Weld or Rubber Ring from 75mm.  
Larger sizes available on request.  
Pipes fully compatible with "Redi" phono line fittings.

### Product Description

- Soundproof pipes and fittings for residential, commercial, drainage metric dimensions
- Thermoplastic mineral-reinforced material
- Ring jointed sockets fitted with certified elastomeric liprings
- 3 or 6 meters long pipes packed in wood frames and protected by film
- Other lengths available
- Pipe support: phonoline sound performances require noise-insulating support available from National Plastic.
- Certified by Fraunhofer IBP, Germany

### Technical Data

- Density: 1.75 g/cm<sup>3</sup>
- Fire resistance: not flammable item complying to Class M1 NF P 92501
- Coefficient of thermal linear expansion; 0.04mm/m x °C
- Colour: RAL 9002 pearl white
- Lip rings certified EN681

### Available Diameters

- 40-50-75-90-100-110-125-160

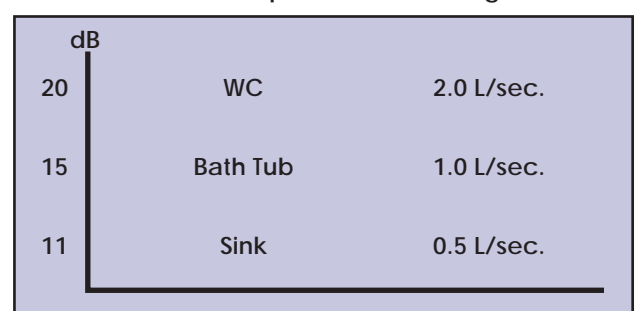
### Installation

- Pipes and fittings cutting, chamfering, cleaning, pipes and jointing must be executed in full compliance with National Plastic instructions

### General Features of the System

- Algae and Bacteria-proof
- Abrasion Proof
- Electrically Insulated
- Extremely High Internal Smoothness
- Shock Resistant
- Corrosion Resistant
- Unflammable M1
- Meet and Exceeds EN 1329
- Noise less than 35 dB

### Performance of National Plastic Acoustic Pipes and Redi Fittings



# Determination of the installation sound level $L_{In}$ in the laboratory

P-BA 85/2012e

Table 1

- Client:** National Plastic & Building Material Industries LLC, P.O.Box: 1943, SHARJAH, UAE
- Test specimen:** Wastewater installation system (test specimen S 10480-01) consisting of "Acoustic Pipe 110x5 mm" plastic pipes (manufacturer: National Plastic SHARJAH) and fittings "Redi Phonoline" (manufacturer: REDI s.p.a.) mounted with pipe clamps "Bismat 1000" (manufacturer: Walraven)
- Test set-up:**
- The pipe system was mounted according to figure 4 (see also Annex A).
  - The system consisted of wastewater pipes (nominal size OD 110), three inlet tees (88°), two 45°-basement bends and a horizontal drain section. The inlet tees in the basement and in the ground floor were closed by lids supplied by the manufacturer. The pipe system was mounted by a technical firm.
  - Pipe system "Acoustic Pipe 110x5 mm": size OD 110, 1-layer pipe, material PVC-U, total wall thickness 5.0 mm, weight 2.77 kg/m, density 1.75 g/cm<sup>3</sup>. One layer fittings "Redi Phonoline", material PVC-U, size OD 110, wall thickness 3.2 mm, density 1.75 g/cm<sup>3</sup> (values are manufacturer's information). Straight pipes without sockets. Connection of the straight pipes with double socket fittings.
  - Acoustic pipe clamps "Bismat 1000" (figure 5): Structure born sound insulating support attachment consisting of supporting (SL) and fixing clips (SX). In each storey (EG and UG) respectively two pipe clamps were installed. A loose clamp in the upper wall area and a Bismat 1000 double clamp in the lower wall area. Two prevent contact to the pipe, the supporting clamp (SL) and the loose clamp were mounted with 15 mm space between the locking tabs of the clamp (two spacers on each side). The clamps were fixed to the installation wall with dowels and thread rods.
- Test facility:** Installation test facility P12, mass per unit area of the installation wall: 220 kg/m<sup>2</sup>, installation rooms: sub-basement (KG), basement (UG) front, ground floor (EG) front and top floor (DG), measuring rooms: UG front, UG rear (details in Annex P and EN 14366: 2005-02)
- Test method:** The measurements were performed following German standard DIN 4109 and EN 14366; noise excitation by constant water flow with 0.5 l/s, 1.0 l/s, 2.0 l/s and 4.0 l/s (details in Annexes A and F).

## Results:

Waste water system "Acoustic Pipe 110x5 mm" with pipe clamps "Bismat 1000" (mounting details see test set-up)				
Flow rate [l/s]	0.5	1.0	2.0	4.0
Installation sound level $L_{In}$ [dB(A)] measured in the basement test-room UG front	46	51	54	56
Installation sound level $L_{In}$ [dB(A)] measured in the basement test-room UG rear	11	15	20	25
Airborne sound pressure level $L_{a,A}$ [dB(A)] <sup>1)</sup>	46	51	54	56
Structure-borne sound characteristic level $L_{sc,A}$ [dB(A)] <sup>1)</sup>	10	14	19	24

<sup>1)</sup> Evaluation according to EN 14366.

**Date of tests:** April 17, 2012

**Comments:**

- The requirements of DIN 4109 only apply for the test room UG rear.
- For the experimental setup investigated in the test facility the used supporting and fixing clips Bismat 1000 normally doesn't guarantee a realistic load transmission. Consequently, in case of practical application in a real building significant higher levels of installation noise may be expected.

# INTERNATIONAL CERTIFICATIONS

Approval Number: 1704511  
Test Report: MATLAB 163M



10<sup>th</sup> April 2017  
National Plastic & Building Materials Industries LLC  
PO Box 1943,  
Sharjah,  
U.A.E

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

## WATER REGULATIONS ADVISORY 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.

**POLYVINYLCHLORIDE (PVC, PVC-U AND CPVC) - COMPONENTS - ONLY LEAD FREE PVC-U LISTED IN THIS SECTION.** 5300

'National Plastic Sharjah-BL'. Blue coloured, extruded, PVC pipe. For use with water up to 23°C.

**APPROVAL NUMBER: 1704511**

**APPROVAL HOLDER: NATIONAL PLASTIC & BUILDING MATERIALS INDUSTRIES LLC**

The Scheme reserves the right to review approval.  
Approval 1704511 is valid between April 2017 and April 2022

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.wras.co.uk/directory](http://www.wras.co.uk/directory)

Yours faithfully

Jason Furnival  
Approvals & Enquiries Manager  
Water Regulations Advisory Scheme

The Water Regulations Advisory Scheme Ltd. Registered in England No. 0660303 Registered office: 6D Llewellyn Close, Hipsall Grove, Skipton, SK7 5ED  
Tel: +44(0)1533 207 9030 Fax: +44(0)1495 245 545 Email: [info@wras.co.uk](mailto:info@wras.co.uk) website: [www.wras.co.uk](http://www.wras.co.uk)



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

Approval Number: 1704560  
Test Report: MATLAB 825L/a

5<sup>th</sup> June 2017  
National Plastic & Building Materials Industries LLC  
PO Box 1943,  
Sharjah,  
U.A.E

## WATER REGULATIONS ADVISORY 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.

**POLYVINYLCHLORIDE (PVC, PVC-U AND CPVC) - COMPONENTS - ONLY LEAD FREE PVC-U LISTED IN THIS SECTION.** 5300

'National Plastic Sharjah-LF PVC Pipe'. Grey coloured, extruded PVC pipe. For use with water up to 60 °C.

**APPROVAL NUMBER: 1704560**

**APPROVAL HOLDER: NATIONAL PLASTIC & BUILDING MATERIALS INDUSTRIES LLC**

The Scheme reserves the right to review approval.  
Approval 1704560 is valid between April 2017 and April 2022

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.wras.co.uk/directory](http://www.wras.co.uk/directory)

Yours faithfully

Jason Furnival  
Approvals & Enquiries Manager  
Water Regulations Advisory Scheme

The Water Regulations Advisory Scheme Ltd. Registered in England No. 0660303 Registered office: 6D Llewellyn Close, Hipsall Grove, Skipton, SK7 5ED  
Tel: +44(0)1533 207 9030 Fax: +44(0)1495 245 545 Email: [info@wras.co.uk](mailto:info@wras.co.uk) website: [www.wras.co.uk](http://www.wras.co.uk)

## CERTIFICATE OF COMPLIANCE

Certificate Number 20120810-E354422  
Report Reference E354422-20120802  
Issue Date 2012-AUGUST-10

Issued to: NATIONAL PLASTIC & BUILDING MATERIAL  
INDUSTRIES LLC  
INDUSTRIAL AREA NO. 1  
STREET NO. 23  
P.O. BOX 1943  
SHARJAH, UNITED ARAB EMIRATES

This is to certify that  
representative samples of RIGID NONMETALLIC PVC CONDUIT  
Schedule 40 rigid nonmetallic PVC conduits in the 1-1/4, 1-  
1/2, 2, 2-1/2, 3, 4, 5 and 6 trade sizes with integral  
couplings.

Have been investigated by UL in accordance with the  
Standard(s) indicated on this Certificate.

Standard(s) for Safety: Standard for Schedule 40 and 80, type EB and a Rigid PVC  
Conduit and fittings, UL651

Additional Information: See the UL Online Certifications Directory at  
[www.ul.com/database](http://www.ul.com/database) for additional information

Only those products bearing the UL Listing Mark should be considered as being covered by UL's  
Listing and Follow-Up Service.

The UL Listing Mark generally includes the following elements: the symbol UL in a circle, with the  
word "LISTED"; a control number (may be alphanumeric) assigned by UL; and the product category  
name (product identifier) as indicated in the appropriate UL Directory.

Look for the UL Listing Mark on the product.

William R. King, Senior Manager, Certification Programs  
UL LLC

All information and documentation including UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please  
contact a local UL Customer Service Representative at [info@ul.com](mailto:info@ul.com)





## Kitemark™ Certificate



This is to certify that:

National Plastic & Building  
Material Industries LLC  
P O Box 1943  
Sharjah  
Sharjah  
United Arab Emirates

Holds Certificate Number:

KM 509597

In respect of:

**BS EN ISO 1452-2  
Plastic Piping Systems for Water Supply -, Unplasticized Poly (Vinyl Chloride) PVC-U), Part 2: Pipes**

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:

Gary Fenton, Global Product Certification Director

First Issued: 15/02/2008

Latest Issue: 09/02/2016



Page: 1 of 2

...making excellence a habit™

This certificate has been issued by and remains the property of BSI Assurance UK Ltd, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 9PS, United Kingdom and should be returned immediately upon request.

To check its validity telephone +44 (0) 845 080 9000. An electronic certificate can be authenticated [online](http://online).

BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.  
A member of BSI Group of Companies.

## K I T E M A R K L I C E N C E



No. KM 79152

BSI hereby grants to:

National Plastic & Building  
Material Industries L L C  
P O Box 1943  
Sharjah  
UAE

In respect of:

**Plastic piping systems for soil and waste discharge (low and high temperature)  
within the building structure - unplasticized poly(vinyl chloride) (PVC-U)**

the right and Licence to use the Kitemark in accordance with the Kitemark Licence Conditions of Contract governing the use of the Kitemark, as may be updated from time to time by BSI, and as approved by the Registrar under the Trade Marks Act 1994 (the "Conditions"). All defined terms in this Licence shall have the same meaning as in the Conditions.

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For and on behalf of BSI:

Anne Boyd, Divisional Director, Product Services Operations

First granted: 12 May 2004

Date: 12 May 2004

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## K I T E M A R K L I C E N C E



No. KM 79153

BSI hereby grants to:

National Plastic & Building  
Material Industries L L C  
P O Box 1943  
Sharjah  
UAE

In respect of:

**Plastics piping systems for non-pressure underground drainage and sewerage  
- Unplasticized poly(vinyl chloride)(PVC-U)**

the right and Licence to use the Kitemark in accordance with the Kitemark Licence Conditions of Contract governing the use of the Kitemark, as may be updated from time to time by BSI, and as approved by the Registrar under the Trade Marks Act 1994 (the "Conditions"). All defined terms in this Licence shall have the same meaning as in the Conditions.

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