







NSF Product and Service Listings

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NSF/ANSI STANDARD 61 Drinking Water System Components - Health Effects

NOTE: Unless otherwise indicated for Materials, Certification is only for the Water Contact Material shown in the Listing. Click here for a list of Abbreviations used in those Listings.

New Products Industries Co., Ltd. (Neproplast)

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Facility : Jeddah, Saudi Arabia



INTRODUCTION

In order to attain the highest standard quality for pipe, NEPROPLAST had associated itself with (LubrizolTM) the world pronounced leader of raw materials manufacture in the USA and Europe to produce licensed FlowGuardTM pipes. NEPROPLAST products are maintained throughout the operation by a Quality Assurance System based on ISO 9001:2008 covering both the raw materials and finished products, which guarantee, the right materials for Hot and Cold water installations demanding safe, tough and reliable systems.

Material:

NEPROPLAST FlowGuardTM Pipes are manufactured in the Kingdom of Saudi Arabia from TempRite Compound approved for Drinking Water by NSF (USA) & WRC (UK). Fully meeting or exceeding the requirements of ASTM Material and dimensional standards. Compounds are meeting the requirements of Class 23447 as defined in the Specification of ASTM D-1784 and designated as 4120 as approved by NSF (USA) and WRAS (UK) for drinking water.

Standards and Assessment:

NEPROPLAST FlowGuardTM Schedule 80 pipes are manufactured as prescribed in ASTM F-441 indicating Manufacturer name, material designation code, pipe size, schedule size with pressure rating in PSI water at 73°F (23°C) and manufacturing date. NEPROPLAST has been assessed and certified by moody International Certification body of Germany for its Quality Management system to International Quality system standard EN ISO 9001:2000 . NEPROPLAST manufactured FlowGuard pipes & Fittings are tested, approved and listed by NSF/ANSI 61 (USA) as "Approved product for use with drinking water.

Colour and Size:

NEPROPLAST FlowGuardTM pipes are offered in Grey colour with a Light Red colour strip with 6 meter length, plain ended pipes. FlowGuardTM pipes are offered from size 1/2" through 8" diameter.

Marking:

NEPROPLAST FlowGuardTM Pipes are marked as prescribed in the ASTM standards indicating size, manufacturer name, material designation code, pressure rating in PSI for water at 73⁰F and manufacturing date similar to below example.



Manufacturer name, materials designation code, pipe size, schedule size with pressure rating in PSI water at 73^oF (23^oC) and manufacturing date







MATERIALS DATA (PROPERTIES) OF NEPROPLAST FLOWGUARD™ PIPES

Table - 1: All values at (73^oF) 23^oC

Properties	Test Method as per ASTM	Unit	Values	
General Properites				
Specific Gravity	D - 792	g/cm ³	1.55	
Water Absorption	D - 570/24hrs	%	0.03	
Cell Designation	D - 1784		23447	
Flame Spread E - 84			< 25	
Poission's Ratio @ 73 ⁰ F			0.38	
Friction Co-efficient	Hazen-William	(Factor) C	150	
Mechanical Properties				
Tensile Strengh	D - 638 / type1	PSI	8,000	
Terisile Stretigit	D - 036 / type i	MPA	55	
Modulus of Electicity in Tonsion	D - 638 / type1	PSI	>360,000	
Modulus of Elasticity in Tension	D - 036 / type i	MPA	> 2500	
Compressive Strength	D - 695	PSI	10,100	
Compressive Strength	D - 093	MPA	70	
Flexural Strength	D - 790 proc.B	PSI	15,100	
riextifal Streffigur	D - 790 ploc.b	MPA	104	
Izod Impact	D - 256 / notch	Ft-Lbs / In of notch	1.5	
izod impaci	D - 230 / Hotel1	JM	80	
Hardness (Rockwell)	D - 2240	Durometer "D"	80 <u>+</u> 3	
Hardriess (Nockwell)	D - 785	Rockwell "R"	119	
Thermal Properites				
Coefficient of Thermal Linear Expansion	D - 696	in/in/ ⁰ F	3.4x10 ⁻⁵	
Cosmoloni or mormal Emodi Expansion	D - 696	cm/(cm ^O C)	6.3 x 10 ⁻⁵	
Thermal Conductivity	D - 177	BTU/hr/ft ² / ⁰ F/in	0.95	
	D - 177	Wm/ ^O k/m ²	0.14	
Heat Deflection Temp @ 264 PSI (1.82 MPa)	D - 648	°C	103	
Vicat Softening temp.	D - 1525(rate A)	°C	95	
Electrical Properites				
Dielectric Strengh	D - 149	Votts/Mil	1250	
Dielectric Constant 60 Hz @30 ⁰ F	D - 150	60cpv.30 ^O F/-1 ^O C	3.70	
Specific Volume Resistivity @ 73 ⁰ F	D - 257	Ohms/cm	3.4 x 10 ¹⁵	
Flammability Properties				
Flammability	D - 635	Resistance	Self-extinguishing	
Rate of burning	D - 635	S	<10	
Extent of burning	D - 635	mm	<15	
Flammability rating	UL-94/0.062"	Rating	V - 0	

DIMENSIONAL SPECIFICATION

Table - 2, Dimension based on ASTM F 441, Schedule 80

Nominal Pipe Size	Outside Diameter		Min.Wall	Thickness	Nominal Weight	Maximum Working I	Pressure @73 ⁰ F
Inch	Inch	mm	Inch	mm	Kg/m	PSI	MPa
1/2"	0.840	21.336	0.147	3.73	0.338	850	5.86
3/4"	1.050	26.670	0.154	3.91	0.457	690	4.76
1"	1.315	33.401	0.179	4.55	0.671	630	4.34
11/4"	1.660	42.164	0.191	4.85	0.928	520	3.59
11/2"	1.900	48.260	0.200	5.08	1.130	470	3.24
2"	2.375	60.325	0.218	5.54	1.560	400	2.76
3"	3.500	88.900	0.300	7.62	3.180	370	2.55
4"	4.500	114.300	0.337	8.56	4.650	320	2.20
6"	6.625	168.275	0.432	10.97	8.870	280	1.93
8"	8.625	219.008	0.050	12.07	13.479	250	1.72

Note: In case operating Temperature is above 73°F/23°C, working pressure must be de-rated

Table - 3, Temperature correction factor

Operating	(°F)	70 - 80	90	100	110	115	120	125	130	140	150	160	170	180	200
Temperature	(°C)	23 - 27	32	38	43	46	49	52	54	60	66	71	77	82	93
Percentage % of Working Pressul derating Factors	re or	1.00	0.92	0.85	0.77	0.74	0.70	0.66	0.62	0.55	0.47	0.40	0.32	0.25	0.18

ADVANTAGES OF NEPROPLAST FLOWGUARD™ PIPES OVER CONVENTIONAL PIPING MATERIALS

Corrosion And Scale Build Up:

NEPROPLAST FlowGuardTM pipes are chemically resistant to nearly all acids. alkalis, alcohols, halogens as well as many other corrosive fluids. Being non-conductor of electricity, it eliminates galvanic or electrolytic corrosion which is the cause of expensive repairs. FlowGuardTM non-corroding properties ensure improved flow, lower maintenance costs and longer performance life.

Chemical Resistance:

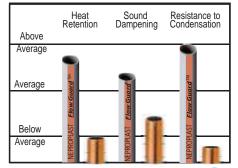
NEPROPLAST FlowGuardTM pipe inhibits excellent chemical resistance against most acids, alcohols, alkalis, salt solutions and halogens. FlowGuardTM pipes are also not adversely affected by atmospheric conditions and are well suited for outdoor installations. For specific applications see the NEPROPLAST chemical resistance chart.

Weak Acids & Bases Fair Fair Halogens Exters & Ketones Aromatic Solvents Solutions Strong Bases Strong Oxidants

Thermal Conductivity:

NEPROPLAST FlowGuardTM pipes have lower thermal conductivity than for metal which reduces heat losses (essentially acts as an insulator) and offer better uniform fluid temperature, prevent "sweating" formation of condensation on the pipe wall. Insulation in certain instances, may be completely eliminated.

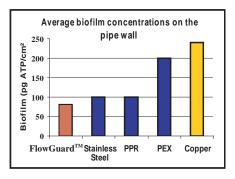




ADVANTAGES OF NEPROPLAST FLOWGUARDTM PIPES OVER CONVENTIONAL PIPING MATERIALS

Low Bacteria Build up:

Studies show that bacteria build up with FlowGuard pipes are far lower than with alternative piping materials. FlowGuard piping systems are resistant to fungi and bacterial growth, particularly those which cause corrosion in metal piping systems.



Reduced Additive migration:

NEPROPLAST FlowGuardTM pipes do not allow the migration of additives into water supply and hence no bad odour or taste of drinking water.



EASE of Handling,Installation & Maintenance:

NEPROPLAST FlowGuardTM pipes are quick and easy to install and maintained with complete range of solvent cement fittings saving time, effort and money as it is light in weight, and easy to handle.



Fire Proof:

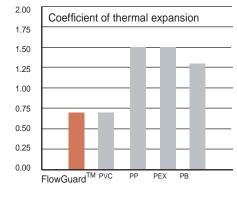
NEPROPLAST FlowGuardTM pipes do not support combustion and are self extinguishing. Pipes will not burn unless an external flame source is applied. NEPROPLAST FlowGuardTM pipes are non-toxic and will not affect taste, smell or colour of drinking water or any other liquid.





Low thermal Expansion:

NEPROPLAST FlowGuardTM pipes have a low coefficient of thermal expansion, hence it reduces the amount of pipe expanding when hot water is flowing, Less need for expansion loops, less "looping"



U.V. Exposure:

Since Degradation process in NEPROPLAST FlowGuardTM pipes has been Dehydrochlorination and not Oxidation. The outdoor exposure of pipes to UV does not break polymer. Hence it has only been limited to surface discoloration.

Mechanical Strength:

NEPROPLAST FlowGuardTM pipes are light in weight, having a specific weight which is about one fifth of steel pipes. This will reduce transportation costs and facilitate pipe installation.

Friction Loss through Piping:

NEPROPLAST FlowGuard $^{\text{TM}}$ pipes being mirror-smooth inner surface has lower friction loss as compared to metals, i.e. Lower pressure losses. The most widely used equation to calculate friction loss in pressure systems is the Hazen-Williams equation

Type of Pipe	Flow coeffic	ient C
Vinyl	150	
Copper	140	(,
Cast iron - unlined	90 - 420	Ť
0 1 1 1 1 1		

Galvanized steel 110 Corrugated steel pipe 60

$$f = 0.2083 \times \left(\frac{100}{C}\right)^{1.852} \times \frac{Q^{1.852}}{D_i^{4.8655}}$$

f = Friction loss (ft. of H₂O / 100ft)

Q = Flow rate (gpm)

 $D_i = Pipe inside diameter (inch)$

C = Flow coefficient

SOLVENT WELDING OF FLOWGUARD™ PIPES AND FITTINGS

The method of joining is very simple and reliable if it is followed correctly, but any deviations from the recommended basic steps may reduce the strength and integrity of the joint. The procedures for preparation, insertion, and curing should be followed very carefully. For further details please consult the manufacturer or its representative

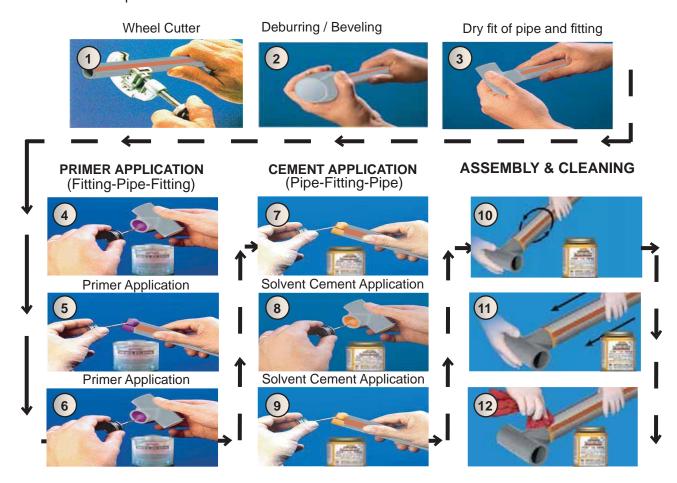


Table - 4:Recommended joint curing time chart (the necessary time to allow before pressurizing system)

Relative Humidiy 60 % or Less		ssure for pipe 2" to 1 1/4"	•	sure for pipe 1/2" to 3"	Test pressure for pipe size 4" to 8"		
Temperature range during assembly and cure periods	UP to 180 Above 180 to 370 PSI		UP to 180 PSI	Above 180 to 315 PSI	UP to 180 PSI	Above 180 to 315 PSI	
60 ⁰ - 100 ⁰ F	01 h.r.s	06 h.r.s	02 h.r.s	12 h.r.s	06 h.r.s	24 h.r.s	
40 ⁰ - 60 ⁰ F	02 h.r.s	12 h.r.s	04 h.r.s	24 h.r.s	12 h.r.s	48 h.r.s	
0 ⁰ - 40 ⁰ F	08 h.r.s	48 h.r.s	16 h.r.s	96 h.r.s	18 h.r.s	08 h.r.s	

Note: All above figures are estimates & approximate

Table - 5: Average number of joints / quart(1kg) of cement.

Pipe Diameter	1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"	8"
Number of Joints	300	200	125	90	90	40	30	10	5

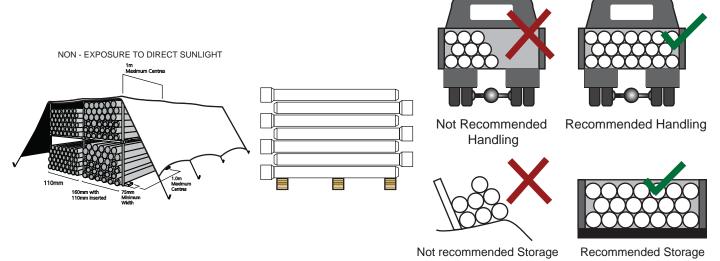




GENERAL MANUFACTURER RECOMMENDATION OR GUIDE LINES

Handling and Storage

Compared to steel, iron or copper pipe, FlowGuardTM pipes and fittings have lower impact resistance (especially at low temperatures). Care should be exercised during transportation, storage and installation. FlowGuardTM pipes installed in high impact areas should be protected accordingly. Piping must not be buried less than 1M in areas of heavy vehicles or construction equipment traffic.Fatigue of the pipe and joints will occur unless they are encased in a suitable metal conduit casing.



Temperature / Pressure

The working pressure of FlowGuard[™] pipes and fittings varies with changes in temperature. Before placing a piping system into service the maximum working pressure should be verified. See (Table 3).

Hanging and Supporting

The modulus of elasticity of FlowGuardTM pipe is smaller than for metal pipes. Maximum working temperature and room temperature should be considered when determining the required support spacing.

Table - 6: Recommended Maximum Support Spacing in feet of FlowGuard [™] pipes

Pipe Size				Schedule			
(in.)	73 ^o F (23 ^o C)	100°F (38°C)	120 ^O F (49 ^O C)	140 ^O F (60 ^O C)	160 ^O F (71 ^O C)	180°F (82°C)	200°F (92°C)
1/2"	3.1	3.0	2.9	2.8	2.7	2.7	2.5
3/4"	3.5	3.4	3.3	3.2	3.1	3.0	2.8
1"	4.1	3.9	3.8	3.7	3.6	3.5	3.3
1 1/4"	4.6	4.5	4.4	4.2	4.1	4.0	3.7
1 1/2"	5.0	4.8	4.7	4.6	4.4	4.3	4.0
2"	5.6	5.5	5.3	5.2	5.0	4.9	4.5
2 1/2"	6.5	6.3	6.1	5.9	5.7	5.6	5.2
3"	7.2	7.0	6.8	6.6	6.4	6.2	5.8
4"	8.3	8.1	7.8	7.6	7.4	7.1	6.7
6"	10.4	10.1	9.8	9.5	9.2	9.0	8.4
8"	12.1	11.7	11.4	11.0	10.7	10.4	9.7

Trench Preparation

When laying FlowGuard[™] pipes below the ground, care should be taken to remove all rocks, boards, empty primer and cement cans, brushes, bottles and other debris from the trench. The smaller diameter of the pipe should be "snaked" in the trench to allow for expansion and contraction. Since solvent cement welding is used for the method of joining. Snaking, pressure testing and pipe movement should not be done until after the joints have been given sufficient time to dry.



GENERAL MANUFACTURER RECOMMENDATION OR GUIDE LINES

Non-Liquid Transport

NEPROPLAST do no recommend its FlowGuardTM Pipes and Fittings for use in air or compressed gas systems. FlowGuardTM pipes and fitting are excellent products for the transport of water and corrosive chemicals, but there are a number of other piping products that are specially designed and suitable for compressed air and gases.

Testing

Air or gas for pressure testing of FlowGuard[™] piping systems is not permitted.

Hydrostatic Pressure Testing Procedure

The assembled joints should be fully cured before filling the system with water.

All valves and air relief mechanisms should be opened at the ends and at elevations. The system should be filled slowly with flow velocities which do not exceed 1 foot per second. This will prevent surges, water hammers with air entrapments.

Water flow should continue until all entrapped air is completely flushed out at every branch of the system. Maintain the 1 ft/s velocity until every valve is checked. A rapidly fluctuating gauge needle during the increase of pressure rise may be an indication that entrapped air still remains in the system. The system should include the appropriate air relief vacuum breaker valves to vent air during normal operation after installation. Trapped air is a major cause of the surge and burst failure in plastic piping systems.

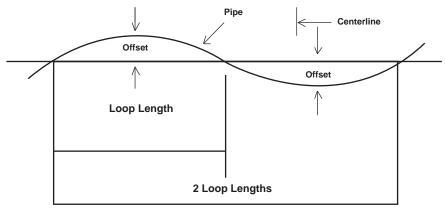
Following filling of the system, do not pressurize until the responsible engineer is present to witness the test. All personnel in the vacinity of the system should wear safety glasses and hard hats. High voltage electrical equipment should be shielded from a possible spray.

The piping system should be pressurized to 120% of its maximum design operating pressure. This pressure must not exceed the working pressure of the lowest rated component in the system, i.e. Flanges, unions, threaded parts, valves, etc.

The pressure test should not exceed 240 hours. This should provide enough time to inspect all joints for leak repair. The system should be then recharged and retested.

Snaking of Pipe

After the FlowGuard[™] pipe has been solvent welded. it is advisable to snake the pipe beside the trench according to the following recommendation. BE ESPECIALLY CAREFUL NOT TO APPLY ANY STRESS THAT WILL DISTURB THE UNDRIED JOINT. This snaking is necessary in order to allow for any anticipated thermal contraction that will take place in the newly joined pipeline.



Pipe Snaking





APPLICATION OF NEPROPLAST CPVC PIPES



WATER SUPPLIES:

Nontoxic NEPROPLAST cPVC pipes will not affect the taste, colour or smell of drinking water. They will never corrode and are therefore extremely sanitary. Deposits and scales will not build up inside as in the case for conventional steel pipes. Their strength is greater than that of asbestos pipe. NEPROPLAST obtained SASO Certification and NSF 61 for drinking water use.



IRRIGATION SYSTEMS:

NEPROPLAST PVC pipes are ideal for agricultural irrigation and sprinkler systems. Non-corrosive NEPROPLAST PVC pipes are perfect for carrying water which contains chemical fertilizers and insect inhibitor. In thick wall and large diameter NEPROPLAST PVC pipes liquids can be transported under high pressure, which is convenient for the management of large volumes.



NEPROPLAST UPVC PIPES CASING & SCREEN:

Engineering difficulties, and the probability of adverse chemical reactions, make it impractical to overcome corrosion and encrustation through the use of protective coating, chemical treatment or cathodic protection. Thus, NEPROPLAST non-corrosion PVC pipes for water well casing and screens rapidly received approval by the appropriate ministry consultants and engineers.



INDUSTRY:

Resistant to most chemicals, NEPROPLAST cPVC pipes have an important role to play in industrial plants. Light, noncorrosive, and easy to assemble, they allow more complex piping work than with steel or cast-iron pipes.



SOIL, WASTE & DRAINAGE SEWER SYSTEM:

Waste lines for corrosive gases, ventilation for office buildings and factories, drainage systems for private homes and elevated highways these are a few of the many possibilities for NEPROPLAST PVC pipes. A full line of PVC fittings is available to ensure easy installation.



MINING:

NEPROPLAST PVC pipes particularly are well suited for draining corrosive liquids found in mines. They make an ideal vent line for pits because they are easily installed in hard to reach places.



PLUMBING & AIR CONDITIONING:

NEPROPLAST Rigid FlowGuard [™] cPVC pipes licensed by Lubrizol (Raw Materilas Producer) are the most popular, widely used type of plumbing plastic pipes for hot and cold water supply lines. NEPROPLAST FlowGuard[™] pipes are also utilised in water Air Conditiong system at 5°.



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