



WATER PROOFING DIVISION

presents

The amazing

PPC

(Durable and Long Lasting)

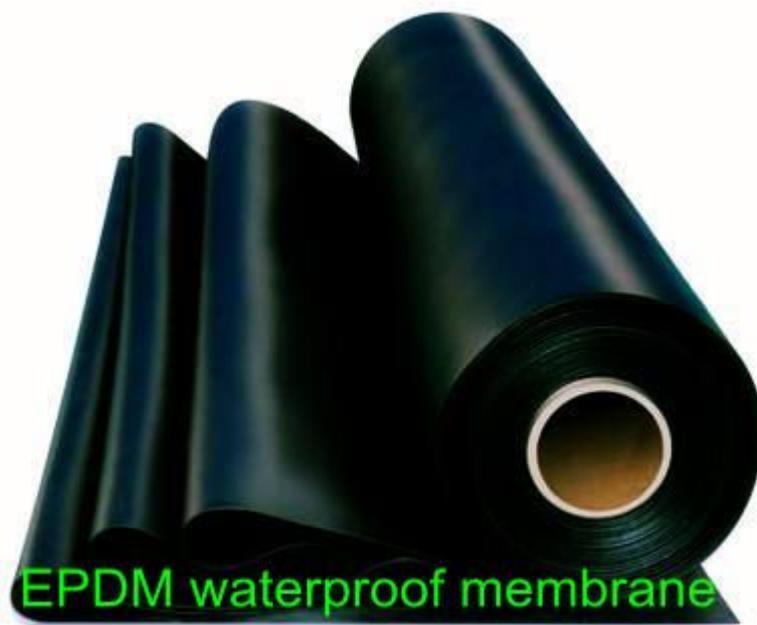
EPDM WATER PROOFING

FOR

-  **ROOFS OF ALL KIND**
-  **POOLS**
-  **CANAL LININGS**
-  **WATER STORAGE TANK**
-  **RESERVOIRS**
-  **UNDERGROUND CONSTRUCTIONS**
-  **GEOMEMBRANE**

IMAGE OF EPDM MEMBRANE

PPC EPDM MEMBRANE



EPDM waterproof membrane

Introduction to
PPC EPDM MEMBRANES

EPDM is an elastomeric compound that is manufactured from ethylene, propylene, and a small amount of diene monomer. These ingredients are synthesized to produce a product that exhibits a high degree of ozone, ultraviolet, weathering and abrasion resistance, and outstanding low temperature flexibility. These ingredients also contribute to resistance to acids, alkalis, and oxygenated solvents (i.e., ketones, esters, and alcohols).

Black EPDM has a smooth surface similar to natural gray slate and does not contain surface granules that can eventually be lost on other materials.

PPC shall supply the imported EPDM Membrane for which full technical data/specs will be provided to you.

PPC EPDM Membrane is supplied in roll-form material wrapped with PE inside and with the outer PP-Woven fabric cover.

The rolls area of 1.2 meter wide and 20-100 meters in lengths. The rolls are brought to the supply point by us while unloading and secured warehousing is to be provided by you.

The entire layment and anything related to the seam-work etc. by our supervisors and assistants is provided F.O.C by us.

Any and all civil works and recommended over layment works are to be done by your contractors at your own costs.

Our supplied PPC EPDM Membrane is guaranteed free from any and all manufacturing defects and is laid into position supervised by our experienced personnel.

LIFE SPAN

The EPDM Membranes, based on the track record of about 3 Billion Sq. ft of its application, in USA and elsewhere in the world, it has performed dramatically 100% well over 40 years period since its such installments. The full life span of this membrane is expected even more over the incoming years provided not subjected to any deliberate mechanical abuse.

“The following table shows the comparative properties of EPDM roof membrane against other material used for roof protection, which indicates superiority of EPDM roof membrane.”

<u>PROPERTIES</u>	EPDM MEMBRANE	BRICK BAT COBA	BITUMEN/ COALTAR BASED SYSTEM
1. WATER RESISTANCE	E	B	B
2. WATER REPELLENT	E	D	D
3. U.V RESISTANT	E	N.D.	D
4. OZONE RESISTANT	E	N.D.	C
5. PRETENSION OF PROPERTIES BETWEEN TEMPERATURE 20°C TO + 100°C	E	D	D
6. ACID / ALKALI RESISTANT	E	D	D
7. RESISTANCE TO COLD CRACKING	E	D	D
8. LIGHT WEIGHT	E	D	C
9. EASE OF INSTALLATION INSTALL ON EXISTING ROOF	E	D	C
10. PERFORMANCE IN UNDER GROUND CONSTRUCTION	E	B	D
11. APPLICABILITY FOR WATER CANAL / RESERVOIR	E	B	C
12. EASE OF REPAIR- MAINTENANCE	E	D	C
13. BONDABILITY WITH VARIOUS SUBSTRATE LIKE CONCRETE, WOOD & ASBESTOS	E	N.D	C
14. PHYSICAL PROPERTIES LIKE TENSILE, ELONGATION ETC.	E	D	D
15. RESISTANCE TO BUILDING MOVEMENT / EXPANSION/ CONTRACTIONS	E	D	D
16. CONSIDERING ABOVE OVER ALL PERFORMANCE	E	B	C

E: EXCELLENT	B: GOOD	C: FAIR	D: POOR
N.D.: NO DATA / NOT APPLICABLE			

TECHNICAL SPECIFICATION

PPC water proofing membrane is based on ASTM – 6134 and available 1.2, 1.5 mm thickness in both side fabric finish as well as smooth finish.

PROPERTIES	TEST METHOD	SPECIFICATION
Tolerance on Nominal Thickness, %	ASTM D 412	15/ - 10
Color	Visual	Black
Hardness	ASTM D 2240	65 ± 10 A
Tensile strength (min)	ASTM D 412	90 kgs/cm ²
Elongation @ Break (min)	ASTM D 412	300 %
Abrasion Resistance (max)	ASTM D 5963	250 mm ³
Compression Set (70°C / 24hrs)(max)	ASTM D 395 method B	24 %
Tear Resistance (Angular) min	ASTM D 624 method C	30
Resistance to Heat Ageing		
Properties after 166 hrs @ 155 °C	ASTM D 573	
--Tensile Strength min	ASTM D 412	85 kgs/cm ²
--Elongation (%)	ASTM D 412	210
--Linear dimensional change max, %	ASTM D 1204	+/-1
Brittleness temperature °C	ASTM D 746	-45
Resistance water absorption after 166 Hrs, immersion @ 70 °C		
% change in mass	ASTM D 471	4.0
Water Vapor Permeability Max.per - mils	ASTM E 96	3.5

PPC membrane is based on ASTM– D 4637 and available 1.2, 1.5 mm thickness in both side fabric finish as well as smooth finish.

Tolerance on Nominal Thickness, %	ASTM D 412	15/ - 10
Color	Visual	Black
Hardness	ASTM D 2240	65 ± 10 sh A
Tensile strength (min)	ASTM D 412	90 kgs/cm ²
Elongation @ Break (min)	ASTM D 412	350 %
Tear Resistance kg/cm	ASTM D 624 method C	30
Drop in physical properties – Ageing		
After 100 °C for 600 Hrs	ASTM D 573	
--Tensile Strength min	ASTM D 412	10%
--Elongation (%)	ASTM D 412	30%
-- Tear resistance (kg/cm)	ASTM D 624 method C	15%
-- Linear dimensional change max %	ASTM D 1204	+/- 2%
Ozone Resistance:- On Exposure to 100 ppm and Ozone in air 96 hrs @ 40 C at 20% strain	ASTM D 1149	No crack
Glass Transition Temperature:-	ASTM D 746	-55
Resistance water absorption after 7 days immersion in 70 °C % change in mass	ASTM D 471	4.0
Compression set, 22 Hrs at 70 °C	ASTM D 395	24%

Frequently Asked Questions
About
PPC EPDM MEMBRANES

1. What is EPDM?

EPDM is an elastomeric compound that is manufactured from ethylene, propylene, and a small amount of diene monomer. These ingredients are synthesized to produce a product that exhibits a high degree of ozone, ultraviolet, weathering and abrasion resistance, and outstanding low temperature flexibility. These ingredients also contribute to resistance to acids, alkalis, and oxygenated solvents (i.e., ketones, esters, and alcohols).

2. What does EPDM look like?

Black EPDM has a smooth surface similar to natural gray slate and does not contain surface granules that can eventually be lost on other materials.

3. As a vulcanized (thermoset) elastomer, how does EPDM differ from other types of single-ply (i.e., PVC, TPO, Single-ply or non-vulcanized elastomer)?

EPDM membrane is a vulcanized/thermoset membrane that has been fully cured in the manufacturing process prior to shipment and delivery to the job site. With aging, EPDM membrane will not leech or emit hazardous chemicals. Unlike non-vulcanized elastomers that may begin curing in the field once exposed to moisture and heat, EPDM membrane has no shelf life. Its physical properties remain stable, which makes repairs much easier in the unlikely event of cuts or tears.

4. How can the performance of EPDM be gauged over the last 40 years?

With over 1 billion square feet of membrane installed worldwide, EPDM has established itself as the membrane for all climatic conditions. This is supported by various laboratory studies and actual field installations. This excellent track record is the result of unique and unmatched physical characteristics:

EPDM has superior resistance to UV (ultraviolet) radiation

EPDM has unmatched resistance to thermal shock

EPDM exhibits superior resistance to cyclic fatigue

EPDM has superior resistance to hail damage

EPDM will not become brittle and will not shatter due to low temperature flexibility

5. What makes EPDM membrane suitable for non-exposed assemblies (i.e, protected membrane applications and double slab installations)?

Structural deflection, improper drain placement, or an insufficient number of drains can result in low areas on the roof that allow moisture to collect and pond over a period of time. Therefore, one of the most important characteristics of a roofing membrane is its moisture resistance. EPDM has excellent moisture absorption resistance that makes the material more tolerable to entrapped moisture than most roofing membranes. Since the early 60s, the material has been successfully used in canals, pond lining and other irrigation systems before its debut as a roofing membrane.

6. What is the maximum size sheet for EPDM membrane?

Sheets as large as 50 feet in width are produced mostly for use in ballasted and mechanically fastened applications. Narrower widths are also produced to offer applicators greater flexibility in positioning membrane.

Narrower sheets are also produced without factory seams (seamless) for use primarily in adhered and mechanically fastened applications. The major advantage of seamless material is the elimination of factory splice T-joints that occur when factory seams intersect with field splices. This reduction in T-joints significantly increases the potential for watertight performance by eliminating potential "water channels" into field splices.

Both narrow and wide sheets are manufactured in varying lengths from 50' to 200'.

7. What are the available thicknesses and types of EPDM single-ply membrane?

EPDM membrane is manufactured in various thicknesses (.045" to .090" thick) and is available as a non-reinforced or reinforced sheet (depending upon application). Other thicknesses are also available for use in non-roofing applications as a special order.

Reinforced membranes contain an internal fabric that is completely encapsulated within the EPDM membrane sheet and is available in various thicknesses (.045" to .075"). Occasionally, a fleece layer can be added to the underside of the sheet that serves as a built-in underlayment for direct re-roof applications over certain types of existing roofing material.

EPDM is also manufactured as vulcanized (cured) or non-vulcanized (uncured) membrane. Vulcanized membranes have set physical properties due to the vulcanization process and exhibit consistent behavior throughout the sheet that allow the membrane to have memory - this means when the membrane is

stretched, it will return to its original state. On the other hand, non-vulcanized EPDM does not have set physical properties because it is not cured when manufactured. This makes the uncured material ideal for use as flashing where the material can be stretched, formed, and shaped.

8. What is the difference between black EPDM and white EPDM membrane?

In addition to the oils and the polymers used to make an EPDM membrane, another ingredient is added to the mix to enhance UV resistance. In the case of a black membrane, carbon black is added, which converts UV rays into heat. With white membrane, in lieu of carbon black, titanium dioxide is typically used to reflect UV rays and prevent it from attacking the polymer.

9. Are EPDM membrane-roofing assemblies fire retardant?

An EPDM roofing assembly can be designed to meet Underwriters Laboratories (UL) and Factory Mutual (FM) fire classifications. Like in many other roofing assemblies, the fire retardency level will depend on roof slope and the various components utilized. Current UL and FM publications contain numerous listings of various approved assemblies.

10. Does EPDM require systematic maintenance or additional coatings or treatment to achieve its life expectancy?

No special coating or other surface treatment is required. General maintenance in the form of good housekeeping should periodically be performed to remove debris and leaves and to investigate the performance of other components.

11. Is the performance of the EPDM membrane adversely affected geographically due to temperature extremes?

In laboratory testing EPDM is subject to the most severe heat aging where samples are subjected to temperatures of 240 F for 4 weeks. Also, in several studies field samples were collected from various geographic locations after years of exposure and in both cases (laboratory and field), the physical properties of the samples exceeded the original ASTM specification. Presently, there are numerous EPDM installations throughout colder regions in the U.S. (i.e., Alaska, Minnesota) as well as in the hot and humid climates of southern Florida and Texas. For the past 25 years, EPDM has been the roofing membrane of choice for many commercial and manufacturing facilities internationally. The material will not shatter in extreme, cold temperatures and remains flexible under severe thermal

shock such as in desert areas where evenings are extremely cold and days extremely hot.

12. Is EPDM environmentally beneficial?

EPDM is one of the most sustainable and environmental materials used today in the construction industry. Its excellent performance transfers to low life cycle costs and less impact on the environment.

The initial production of the membrane has a low embodied energy number (the amount of energy required to produce and implement a product from material extraction, manufacture, and installation). In addition several other components (such as cleaners, primers and adhesives) were developed for use with the EPDM membrane to reduce VOC (Volatile Organic Compounds) emissions during installation.

Post-industrial products can be reincorporated (recycled) into the manufacturing of other roofing products and accessories (i.e., walkways and roofing tiles) thus minimizing the impact on landfills.

13. Is EPDM UV resistant?

After more than two decades of field exposure in different climatic conditions, samples collected of EPDM membrane show no evidence of crazing or cracking. As a result of the excellent UV resistance, EPDM membrane can be warranted up to 30 years. Does ponded water have any affects on the performance of EPDM membrane? Since its infancy, when EPDM was used primarily for pond lining and canals, it has demonstrated excellent resistance to moisture absorption. This characteristic made the membrane a candidate for many underground-waterproofing applications where the material was buried in saturated soil. (EPDM meets ASTM D 3083 "Resistance to Soil Burial for Underground Application.")

Moisture found in ponding areas has caused decay of organic felts (built-up roofs), algae growth (light colored roofs), granule loss (modified bitumen roofs), and premature curing and surface cracking (non-vulcanized thermoplastic membranes). This moisture has absolutely no affect on EPDM membrane.

While it is always good roofing practice to provide positive drainage for any roofing assembly, EPDM membrane offers greater safety margins in the event of deflection and subsequent ponding.

14. What is the expected longevity of EPDM membrane?

With many EPDM installations exceeding 40 years of exposure in the field under various climatic conditions, none of the material tested has shown alarming signs of degradation. Even though it would be difficult to predict, studies have shown aged EPDM membrane as having a potential life expectancy of 50 years.

15. Does hail affect the physical characteristics of EPDM?

EPDM passes the Factory Mutual (FM) 4470 testing procedure that includes hail resistance, and does not show fatigue from the impact the membrane must endure during a hailstorm. Hail warranties are available and offer protection against 1 inch and 2 inch diameter hail.

16. How does EPDM perform in expansion and contraction situations? Should relief or control joints be utilized the same as on a built-up roof?

Relief or control joints are commonly used with built-up roofs to subdivide a larger roof area and segregate possible damage into one small area. EPDM, due to its flexibility (-49 F) and elongation, will accommodate stresses caused by temperature extremes, structural movement, and deflection. In cases where the building is designed with expansion joints, the design should be carried all the way through to the roof and an expansion joint should be incorporated into the roof design.

17. What is the cause of bridging that has been seen in the past at angle changes in some EPDM loose-laid applications?

Some membrane bridging has been observed in the past in some loose-laid ballasted membrane assemblies. The bridging was not seen in adhered or mechanically-fastened applications where the membrane is adhered or secured in place. The cause of this bridging relates to membrane movement experienced in ballasted roofing systems and insufficient securement in the angle change at the base of parapets. This phenomenon was not seen in every ballasted loose-laid assembly but only some (mostly in colder regions) where improper securement is present. Examples include:

Roofing nails used to anchor the roofing membrane to a horizontal wood nailer
Improperly anchored beveled wood nailers fastened to the vertical wall (warping and buckling of the wood occurred)

Rubber nailing strips fastened horizontally or vertically

In 1987, the method of securement was changed to incorporate 2" diameter plates and threaded fasteners spaced at 12" on center or a reinforced strip (glued

to the underside of the roofing membrane at the angle change) to anchor the roofing membrane. This change in securement method eliminated the bridging. Both NRCA and SPRI have endorsed this securement.

18. Have the ASTM standards for linear dimensional stability (for EPDM) been modified?

The ASTM standard for linear dimensional stability (ASTM D 1204) was originally 2% maximum. In the mid-90s the standard was changed to 1% maximum. The change in the ASTM standard was influenced by the belief that membrane shrinkage may be a contributor to the bridging seen on some old ballasted applications. In reality, EPDM has always exhibited a dimensional stability value of much less than 1%, even when the ASTM Standard was 2%.

19. What can I put on snow and ice to facilitate melting and one effect the EPDM or my warranty?

Calcium Chloride will work in most conditions. It can either be spread over the area of concern or placed in a nylon stocking and placed along/around the areas in need of melting. While the Calcium Chloride will not harm the EPDM caution should be taken in regards to where the melt water run will drain, and verification that it will not affect the materials and or vegetation it comes in contact should be obtained prior to placing the Calcium Chloride on the roof.

20. Do I have to worry about stain hardening and potential deterioration in the future when a hailstorm comes in contact with my EPDM Roof?

Neither manufacture of EPDM has seen evidence of strain hardening in EPDM membrane at anytime in their life.



POLYMER PRODUCTS CORPORATION



(A Member of the Product Group of Companies)

237/C NACLASS 24, DEH DIH TALUKA , DISTT EAST KORANGI CREEK, KARACHI
Tel: (+92-21) 35090568, 35090569, 35090826, 35090858, 35093513, 35404077,37093938, Fax: (+92-21) 350903512,
E-mail: info@theproductgroup.com , Web: www.theproductroup.com