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Thermoplastic membranes

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Material and system description

Thermoplastic materials are distinguished from thermoset materials in that there is no chemical crosslinking. These membranes can be repeatedly softened by heating or hardened when cooled. Because of the materials' chemical nature, thermoplastic membranes typically are seamed by heat welding with hot air or solvent welding.

There are five common subcategories of thermoplastic roof membranes.

- Polyvinyl Chloride (PVC)
- PVC Alloys or Compounded Thermoplastics
 - Copolymer Alloy (CPA)
 - Ethylene Interpolymer (EIP)
 - Nitrile Alloys (NBP)
 - Tripolymer Alloy (TPA)
- Thermoplastic Olefin (TPO)
- Chlorinated Polyethylene (CPE)

The most common thermoplastic roof membranes are PVC and TPO. The following provides general descriptions of these two systems.

Polyvinyl Chloride (PVC)

PVC sheets are produced by calendaring, spread coating or extruding, and typically are reinforced with polyester or glass-fiber mats or scrim. PVC sheets contain plasticizers and stabilizers, as well as other additives to impart flexibility and achieve other desired physical properties. Some membranes are available with nonwoven fleece backing adhered to the underside of a sheet.

- Sheet widths range from 6 feet to 12 feet wide.
- Sheets are typically 45 mils to 90 mils thick.
- Seams are sealed by heat or chemical welding.
- PVC membranes are produced in numerous colors, though gray and white are the most common.

Thermoplastic Olefin (TPO)

TPO membranes are produced by calendaring with lamination, extrusion with lamination, or extrusion-coating techniques. TPO sheets are a blend of polypropylene and ethylene propylene polymers and usually are reinforced with polyester. TPO sheets contain colorant, flame retardants, UV absorbers and other proprietary substances to achieve desired physical properties.

- Sheet widths range from 6 feet to 12 feet wide
- Sheets are typically 40 mils to 100 mils thick
- Seams are sealed by heat welded with hot air
- TPO membranes commonly are white



Example of a TPO roof system

PVC and TPO roof membranes can be installed fully adhered, mechanically attached or ballasted. Most PVC and TPO membranes do not receive surfacings.

Material standards

NRCA does not make any recommendations about which TP product or manufacturer to use; however, NRCA does recommend that TP products meet standards established by ASTM International.

- ASTM D4434, "Standard Specification for Poly(Vinyl Chloride) Sheet Roofing"
- ASTM D6878, "Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing"

Warranties

When purchasing a new roof system, there will be two warranties to consider. First, there will be the manufacturer's warranty. In general, these warranties cover defects in the manufacture of the roof membrane. Please read [NRCA's consumer advisory bulletin addressing roofing warranties](#) for more information. Once the project is complete, be sure the contractor provides you with a certificate for your records.

Second, the roofing contractor will provide you with a warranty covering his workmanship. Typically, this will cover installation and related issues. The warranty should contain what items are covered and what will void them. Many contractors offer one year or two years of coverage; however, there is no industry standard.

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