50+ YEARS Hypalon®

Over 50 Years of Proven Performance in Roofing

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For more than 50 years, Hypalon® chlorosulfonated polyethyene synthetic rubber has been lauded by customers as an outstanding material for use in commercial and industrial roofing. First commercialized in 1951 by DuPont, and now a product of DuPont Dow Elastomers L.L.C., Hypalon® has been used in a wide variety of demanding applications, such as jackets for nuclear cable, fuel pump hose, industrial machinery gaskets and geomembranes for both potable and industrial applications. Based on its strength, flexibility, tear resistance, weatherability, chemical resistance, design latitude and overall performance history, Hypalon® is also a premier choice for single-ply roofing systems.

Three Basic Types of Single-Ply Roofing Membranes

The Single-Ply Roofing Institute (SPRI) recognizes three basic types of single-ply roofing membranes:

1. Thermoset
2. Thermoplastic
3. Modified bitumen.

Thermoset membranes, like EPDM, are made from compounds based on rubber polymers. They are vulcanized (cured) with heat during the manufacturing process, and as a result the polymer molecules become permanently formed, or "set." The curing process improves the overall strength of the thermoset membrane.

Thermoplastic membranes, such as PVC for example, are based on plastic polymers. They soften when heated, and harden when cooled. In roofing membranes, this is advantageous when it comes to seaming, as this process can be repeated, with little change to the underlying polymer.

Classified as a single-ply membrane, modified bitumen can be considered a cross between single-ply and traditional built up roofing (BUR). Bitumen sheets are factory manufactured and reinforced with one or more layers of polyester, fiberglass or similar fabric. The bitumen is modified with plastic (e.g., APP) or rubber (e.g., SBS) polymers to enhance flexibility. The membranes are installed and sealed using either a torching process or a hot asphalt mopping process to melt the asphalt into the underlayment. The underlayment acts to protect the insulation from the heat.

Chemically, Hypalon® is chlorosulfonated polyethylene (CSPE). It is a unique polymer in that it remains thermoplastic during fabrication of the roof, enabling a roofing membrane based on Hypalon® to be hot air welded on the roof. Once the membrane is installed and exposed to moisture and sunlight, it slowly cures, gaining the high strength of a thermoset rubber. In effect, it has the best features of both thermosets and thermoplastics.

Benefits of Hypalon® in Roofing Membranes

Plasticizer Free
Hypalon® has been widely selected in the roofing industry because it delivers a number of important benefits to building owners and contractors alike. Compared with other single-ply systems, Hypalon® roofing systems do not use asphalt, and thereby avoid the hazards of open flame torch application associated with modified bitumen roofs. It also does not contain fugitive plasticizers that can cause excessive shrinking (tenting) or hardening with time.

Improved Strength with Aging
Various research studies have proven the multiple advantages that Hypalon® delivers in single-ply roofing. A number of outdoor aging tests performed over the years have demonstrated that the strength and abrasion resistance of Hypalon® actually improves over time. This is a direct result of the progressive curing attributes inherent to the compound. A long-term weathering study performed in Florida exposed Hypalon® vulcanizates to direct sunlight for 20 years. After 20 years, the modulus (tensile stress required to produce a certain elongation) values of the vulcanizates had improved from 26 to 40 percent.

UV, Ozone and Chemical Resistance
Nature is the worst enemy of nearly every type of roofing system. Ultraviolet rays, ozone, rain, sleet, snow, airborne and waterborne chemicals, and temperature extremes can cause many roofing materials to crack, discolor, stiffen and, ultimately, leak. However, due to its unique characteristics, Hypalon® has delivered long service life results under some of the worst conditions.

The chemical structure of Hypalon® provides outstanding resistance to the deteriorating effects of sunlight, atmospheric pollutants, and attack by atmospheric ozone. In accelerated sunlight testing, roofing membranes based on Hypalon® showed no visible surface cracking or discoloration, and no evidence of stiffening, even after exposure to 3,000,000 Langleys (units of sunlight exposure). This is the equivalent of 17 years of Arizona sunlight, or 29 years of sun in northern New York.

In addition to sunlight and ozone resistance, membranes made of Hypalon® are also resistant to a broad range of corrosive chemicals, such as some oils and grease, aliphatic solvents, and a wide range of oxidizing agents. For example, these membranes have been reported to resist vegetable oils common to restaurant locations; petroleum oils such as those found near oil refineries; many acids and bases such as sulfuric acid and sodium hydroxide found near fossil fuel facilities; Freon® used in air conditioning, and glycols, which are air conditioning by-products; and jet fuel found near airports. In actual one-sided exposure tests to these fluids, Hypalon®-based membranes performed better than or equal to competitive membranes based on plasticized PVC and EPDM.

Process control technicians monitor the Hypalon® production process.

The chemical composition of Hypalon® also inherently improves the flame retardancy of the membrane. For this reason, it has been selected as a desirable membrane for applications such as restaurant roofing systems. Additionally, Hypalon® is generally resistant to the growth of mold and fungus, which is a characteristic increasingly more important in the roofing and construction industries.

Installation Versatility
From an installation standpoint, Hypalon® offers roofing system designers and building owners many options from which to choose. The material can be installed

A Brief History of HYPALON®

1940 Basic patent for Hypalon® is issued to DuPont.

1951 DuPont commercializes Hypalon® as a synthetic rubber for general uses.

1952 Hypalon® is officially introduced at American Chemical Society meeting in Cinicinnati.

1957 Manufacture begins at the Beaumont Works Plant in Texas.

1959 DuPont installs Hypalon® on test roof in Florida.

1966 First European installation of Hypalon®-based roofing membrane in Switzerland.

1975 J.P. Stevens & Co. begins producing Hypalon®-based materials for use as pond and pit liners.

White Hypalon®-based roofing membranes such as Stevens Hypalon® can meet the EPA Energy Star Roof Products Program requirements and can help building owners throughout the U.S. to cut their energy consumption and save money.

using several common installation methods, including: mechanically attached, fully adhered, stone or paver ballasted, or installed as a vented roof system (VRS). In a VRS installation, the roofing membrane is fastened around the perimeter of the building as well as around all rooftop penetrations, and loose laid on the building with a series of one-way release vents strategically installed.

Hypalon® has a high yield elongation, and is flexible at temperatures as low as -40°F (-40°C). Low temperature flexibility allows for easier handling during installation in cooler weather. The sheet stays flatter, and is easier to unroll for placement. This can be an important consideration, as it can extend the roofing installation season into the cooler months. Also, the lower thermal expansion and contraction of the material offers significant advantages in terms of seam integrity on roofs subject to wide temperature fluctuations.

Energy Efficiency and Lower Maintenance

Hypalon® roofing membranes were among the industry's first white, reflective, roofing membranes, and as such, have a long track record of helping building owners save money. In a study performed on a sunny day in Delaware, temperature measurements of a white reflective Hypalon®-based roof rose only 4°F, while the temperature on a black roof rose 42°F. Many building owners with white, reflective Hypalon® roofing systems have reported significant savings in their cooling bills, often in the tens of thousands of dollars over the life of the roof. On new buildings, the lower cooling requirements associated with a white reflective roofing system can help building owners not only cut their A/C expenses, but also save money by enabling them to purchase smaller or less powerful A/C units. Additionally, buildings with white roofs can help to improve the local air quality by not contributing to Urban Heat Islands.

In addition to the standard low slope and steep slope roofs, there are a variety of unusual roof shapes that membranes made of Hypalon® can accomodate, for example, domes, barrels, tented structures, geometric shapes and other hard-to-fit spaces.

The durability of Hypalon® in a roofing system makes it a favorite among plant engineers, who are concerned with lower maintenance and operating costs. The durability, strength and abrasion resistance of the material are some of the reasons buildings owners and architects have specified it when concerned about making roofing maintenance easier, less frequent, and less costly. Hypalon® roofs have been shown to last for more than 20 years, with repair costs being reported as "minimal."

If a repair is needed, it can be easily accomplished using simple procedures developed by the membrane manufacturer. Repair procedures involve cleaning any weathered sections, solvent wiping and/or priming, and then heat sealing or bonding with a contact adhesive. Professional roofing contractors can easily seam older, previously installed sections of Hypalon®-based materials to new ones, when building additions have been added, or sections of other roofing materials have been replaced on adjoining roofs.

Design Latitude

Hypalon® membranes can be manufactured in a spectrum of colors, and can become an active part of a building's design. A variety of UV-stable pigments are compatible with the polymer, and generally will retain their color and performance properties, despite continual exposure to sunlight. Strong primary colors, pastels, even fluorescent colors can be used individually or in combination to provide distinctive designs.

Architects say they like to select roofing based on Hypalon® because it offers them exceptional design latitude. In addition to the standard low slope and steep slope roofs, Hypalon® can be installed on a wide variety of unusual roof shapes such as domes, barrel vaults, geometric shapes and other hard-to-fit spaces. In combination with the spectrum of colors available, there is almost no limit to the creativity that can be employed in designing a one-of-a-kind signature roof.

Perhaps that's why a Stevens Hypalon® membrane was installed on the 260,000 sq. ft. Rose Garden Arena in Portland, Oregon, home to the NBA Portland Trailblazers. The job involved 27 different roof sections ranging in height from 15 to 130 feet and three different installation methods — mechanically fastened, fully adhered, and VRS — all with two different shades of gray Stevens membrane.

Certifications

When properly compounded, fabricated and installed, Hypalon® roofing systems have achieved the following certifications:

- Underwriters Laboratory Class A, Factory Mutual Class 1A flammability ratings,
- Factory Mutual windstorm resistance ratings up to classification 1-270,
- North American and International building code approvals.

The high performance of Hypalon® is hardly situational or specialized. Hypalon®-based roofing membranes are adaptable to many different types of buildings, in diverse climates, in various regions of the country and around the world. They are durable and efficient in new construction as well as re-roofing applications. In designing a new building, repairing an old one, or planning a new construction project, Hypalon® roofing membranes have withstood the test of time and added value to many commercial, industrial and institutional buildings across the U.S. and around the globe.▲

Stevens Hypalon® was selected for the Rose Garden Arena in Portland, Oregon, home to the NBA Portland Trailblazers. More than 250,000 square feet of gray Stevens Hypalon® was installed on 27 separate roof decks for this project. The installing contractor was Eagle Roofing Company of Bend, Oregon.

1980

J.P. Stevens & Co. introduces Hypalon®-based Hi-Tuff roofing membrane.

1989

Stevens Roofing Systems sells its first million square foot roofing system made of Hi-Tuff roofing membrane.

1991

Stevens sells its largest single-facility roof using Hi-Tuff. The roof was nearly 1.8 million square feet in size!

1996

Stevens Roofing Systems surpasses the one billion square foot mark in manufacturing Hypalon®-based membranes.

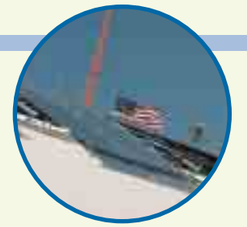
DOW

1996

DuPont Dow Elastomers is formed as a joint venture between DuPont and Dow Chemical Company.

2003

Nearly 800,000 square feet of Hypalon®-based material manufactured by Stevens Roofing Systems is installed on new Smithsonian Air and Space Museum.



STEVENS ROOFING SYSTEMS