



Your
Commercial & Industrial
FLAT ROOFING EXPERTS

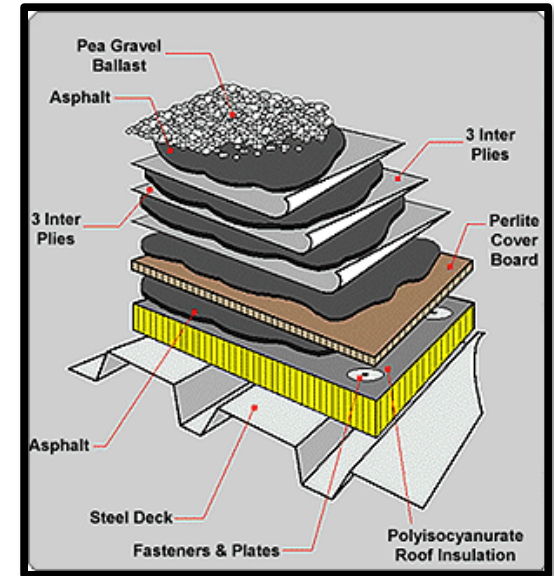


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History Of Flat Roofing Systems

From The Start...

Low Sloped Roof Systems



Low Sloped Roof Systems

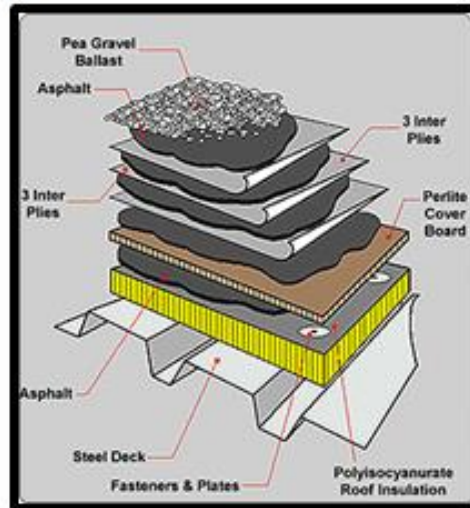
Asphaltic/Bituminous Based

BUR Built Up Roof

↕
Oxidized Asphalt

↕
Coal Tar Pitch

↕
Rubberized Asphalt



Mod Bit (Modified Bitumen)

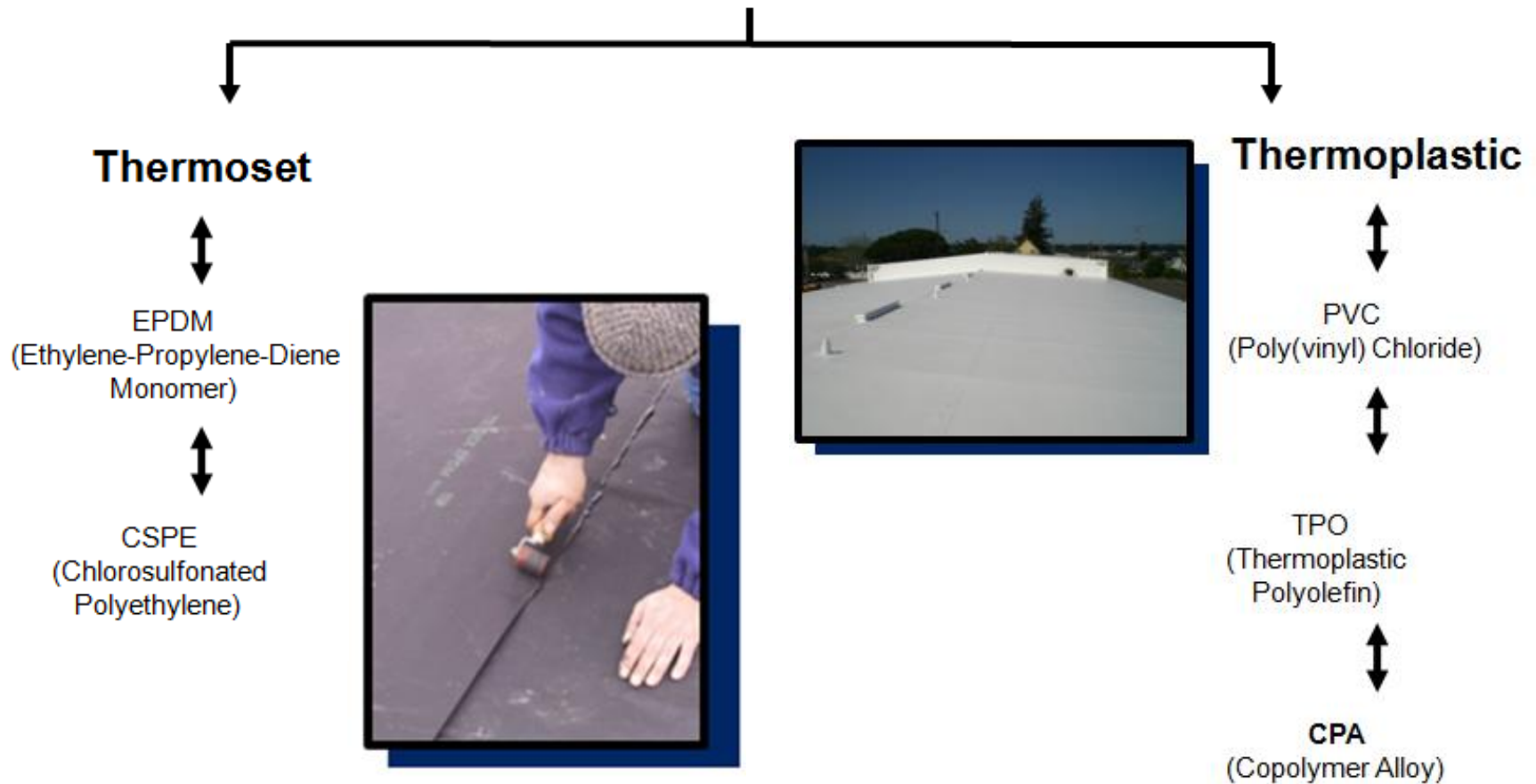
↕
APP
(Atactic Polypropylene)

↕
SBS
(Styrene-Butadiene-Styrene)

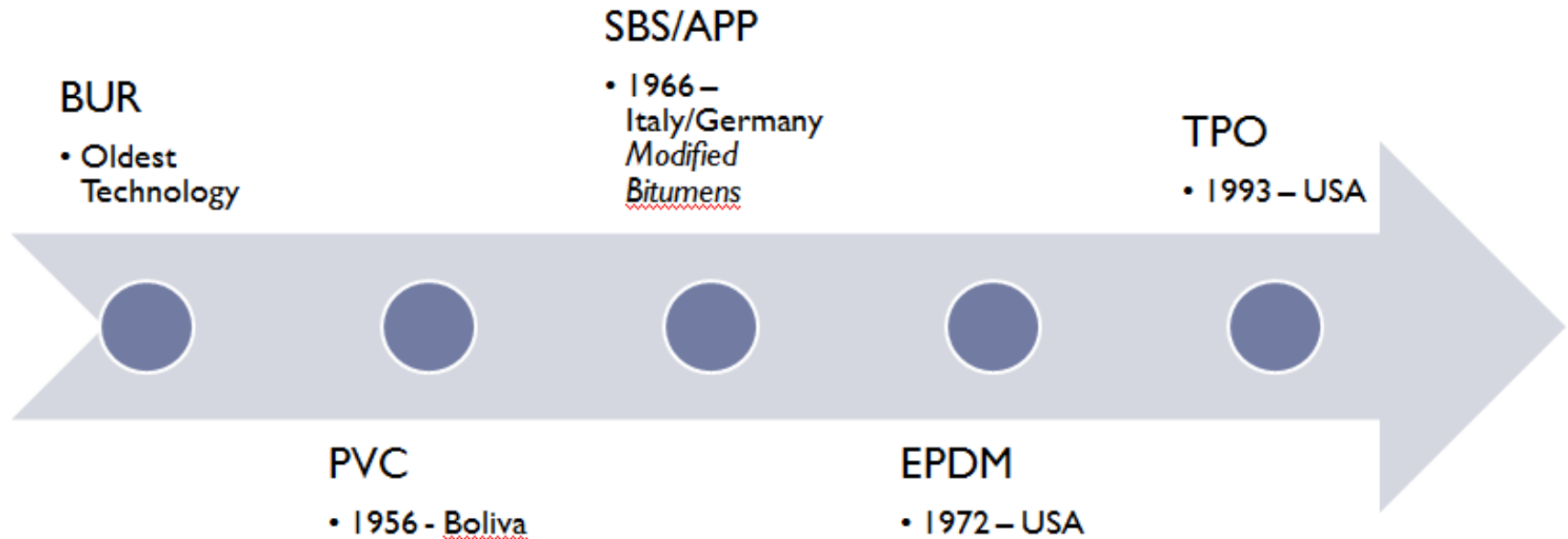


Low Sloped Roof Systems

Polymer Based



Historical Review Of Roofing Membranes



Note: PVC Roofing Technology – 2nd Most Established Roofing Material

Built Up Roofing



- Semi-flexible material
 - Constructed with plies of felts, fabrics or mats applied on the roof with alternating layers of bitumen.
- Surface covered with aggregates
 - Mineral granules or coatings.
- Bitumen is typically asphalt or Coal Tar
 - Refined from crude oil, coal tar pitch (destructive distillation of coal) or modified asphalt (addition of rubbers or plastics to asphalt)

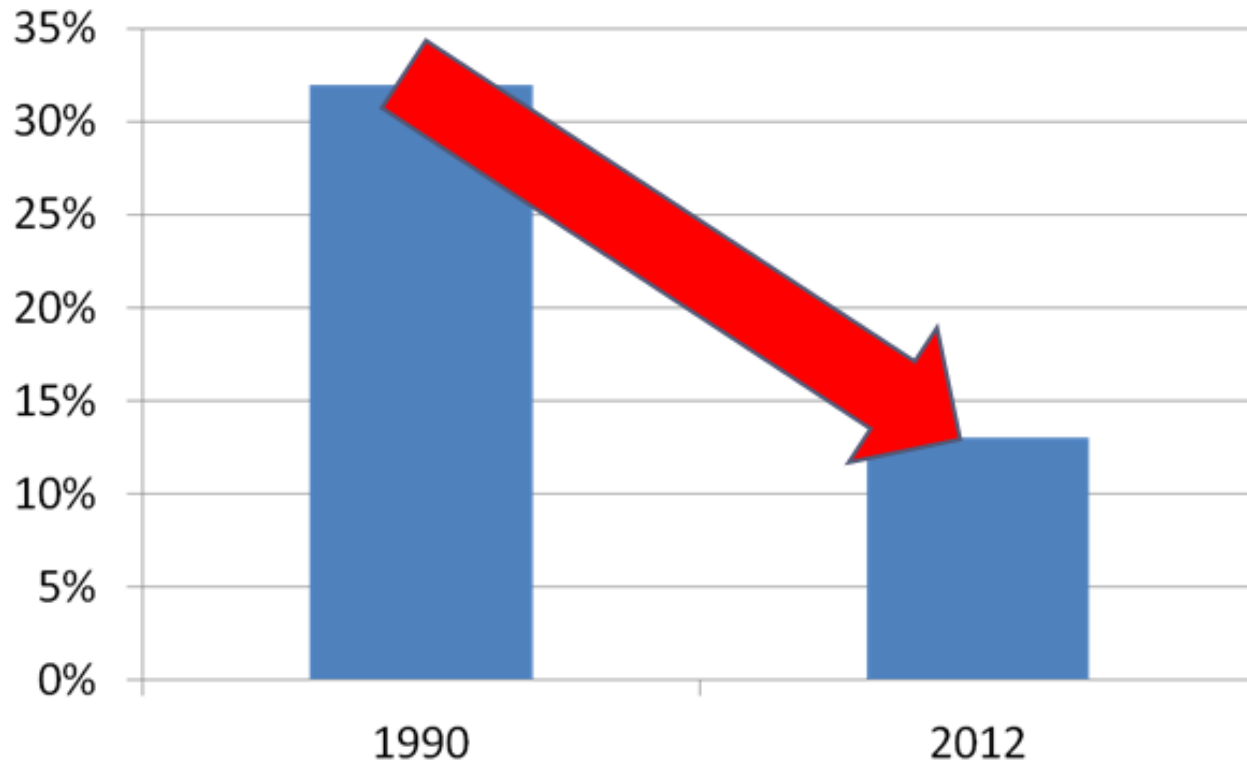
More sophisticated methods of oil refining have left asphalt very weak in UV strength.

The average life of this system is now only 15-18 Years.

This system is NO LONGER PERMITTED on new roofs in downtown Toronto.

Built Up Roofing

Noticeable Declines in Market Share



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Modified Bitumen



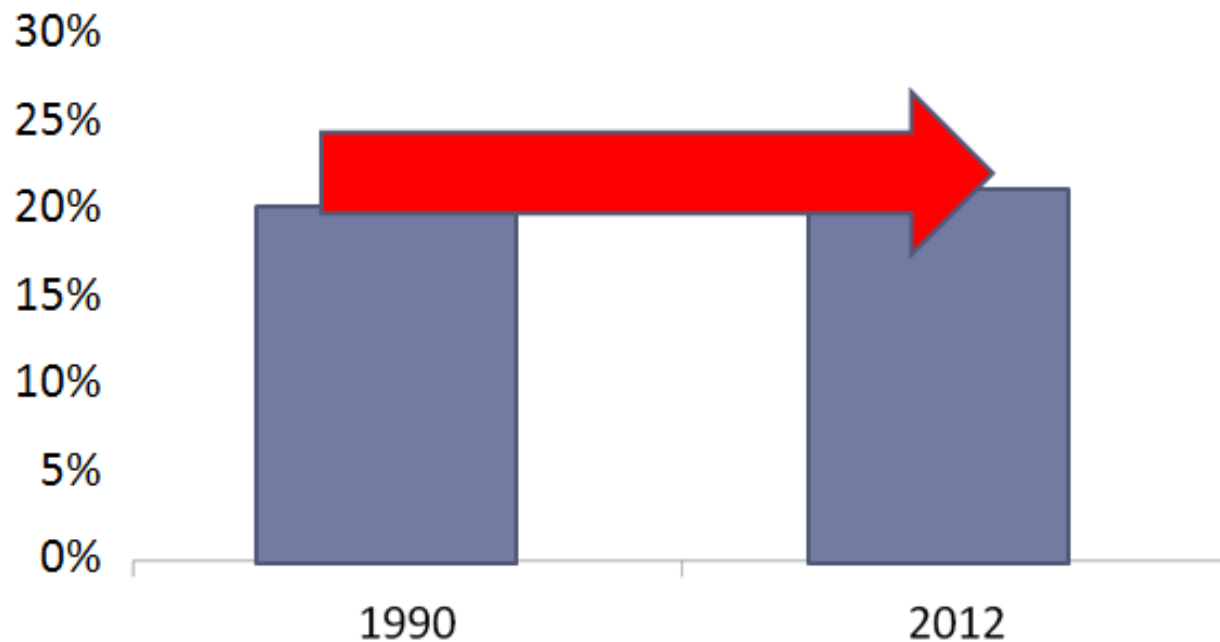
- Modified asphalt, reinforcing layers with optional mineral, ceramic or metallic surfacing.
- Definition of Modified Asphalt: atactic polypropylene (APP) or styrene butadiene styrene (SBS) added to asphalt bitumen.
- Normally installed as a 2-Ply system (Torch Welded)



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on new roofs in downtown Toronto.**

Modified Bitumen

Market Share Remains Relatively Flat



Source: RSI Magazine December 2004 issue "2005 State of the industry Report "
& 2012 SPRI Report

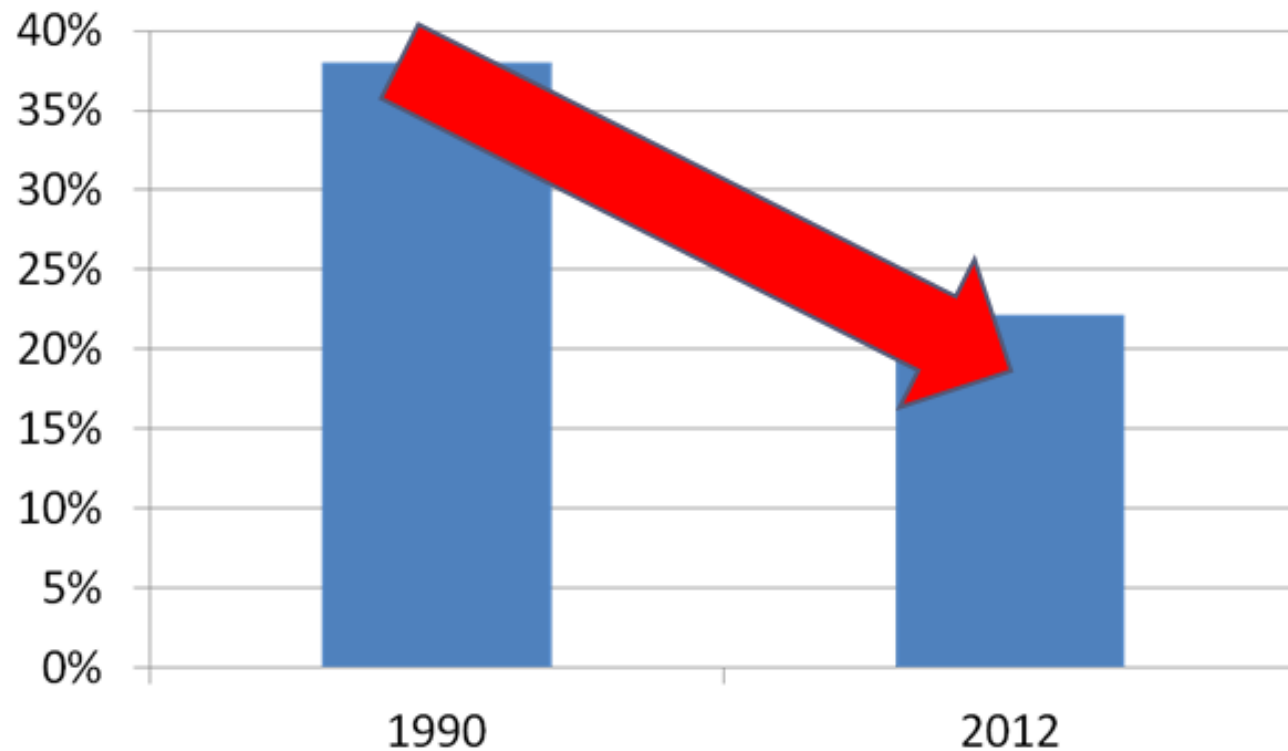
Thermosets



- **Formed by chemical bonds** (cross linking)
- Results in formation of networks and requires “curing”. *(Once the linkages have been formed (cured) they cannot be changed.)*
- **Typical Thermosets Include:**
 - **EPDM** - Ethylene propylene diene monomer, typically vulcanized (reinforced & non-reinforced),
 - **CSPE** - Chlorosulfonated polyethylene (Hypalon), is a self curing non-vulcanized elastomer reinforced with a polyester scrim

Thermosets

Sharp Declines in Market Share



Thermoplastics

- **Plastics (Organic Polymers)**

- Melt when heated and formed by physical bonds
- Thermoplastics can be reprocessed by application of heat
 - They can be welded together over the life of the product.
 - Typically the strengths of the weld exceed the strength of the base material.

- **Typical thermoplastics are:**

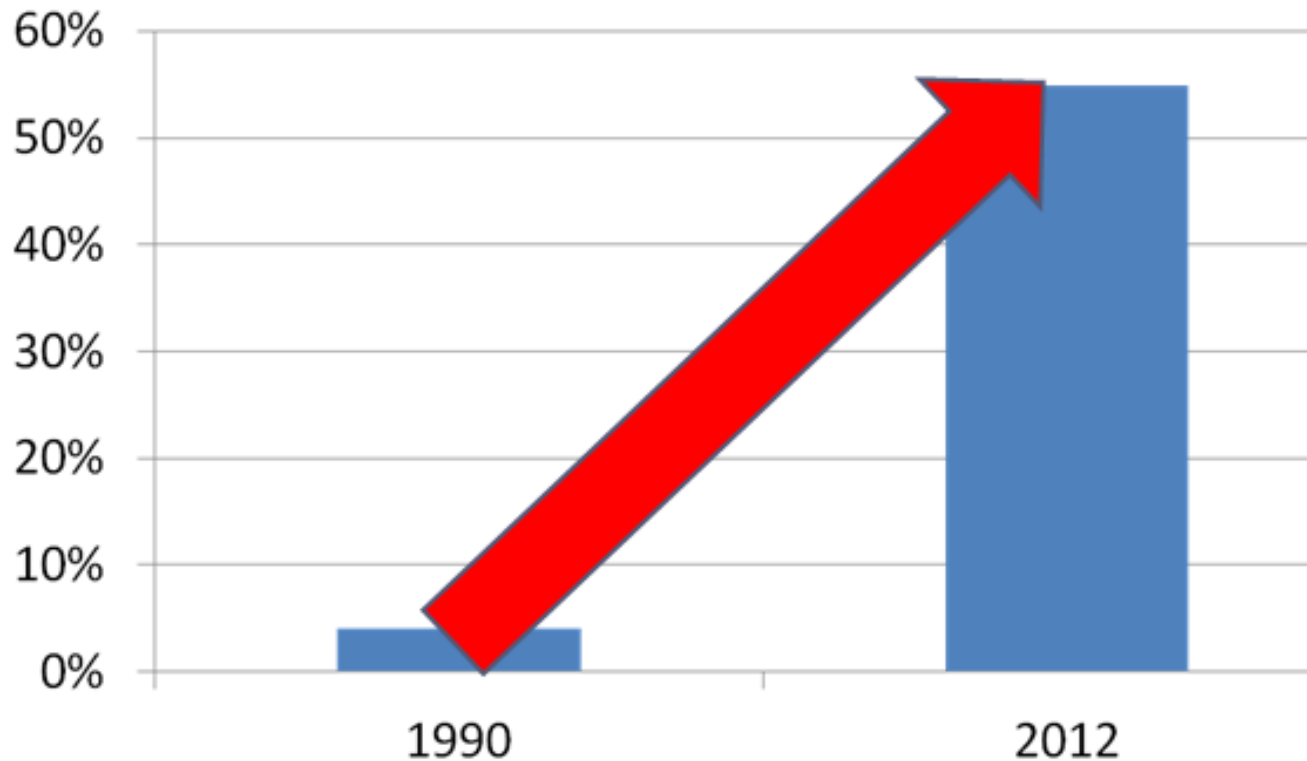
- **PVC** – Polyvinyl chloride,
- **CPA** – Co-polymer alloy
- **TPO** – Thermoplastic polyolefin.

Note: All thermoplastics are reinforced with a scrim



Thermoplastics

The only product group to show a significant market share increase



TPO Overview

- **Weathering**
 - WSRCA field study: 6 mils of degradation in first 3 years.
- **Seaming**
 - Narrow welding window
 - Re-welding_(repairs) Problematic
 - Non-treated (*wicking*) Srim
- **Fire**
 - Fire test clearly shows issue surrounding ASTM E-108
 - TPO is flammable



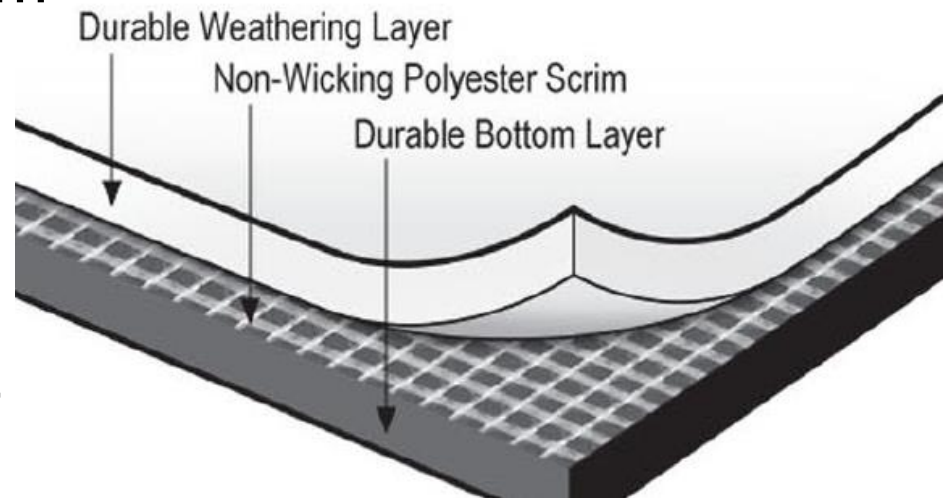
See fire tests:

<http://www.youtube.com/watch?v=g-MlXboGAhc>

<http://www.youtube.com/watch?v=AgrRBuTfuf8c>

PVC Overview

- Remains weldable throughout lifecycle.
- Durable Weathering Layer
(30–35 years)
- Treated *anti-wicking* Scrim
- Durable Bottom Layer
- Fire
 - Fire test clearly shows PVC is NOT FLAMIBLE



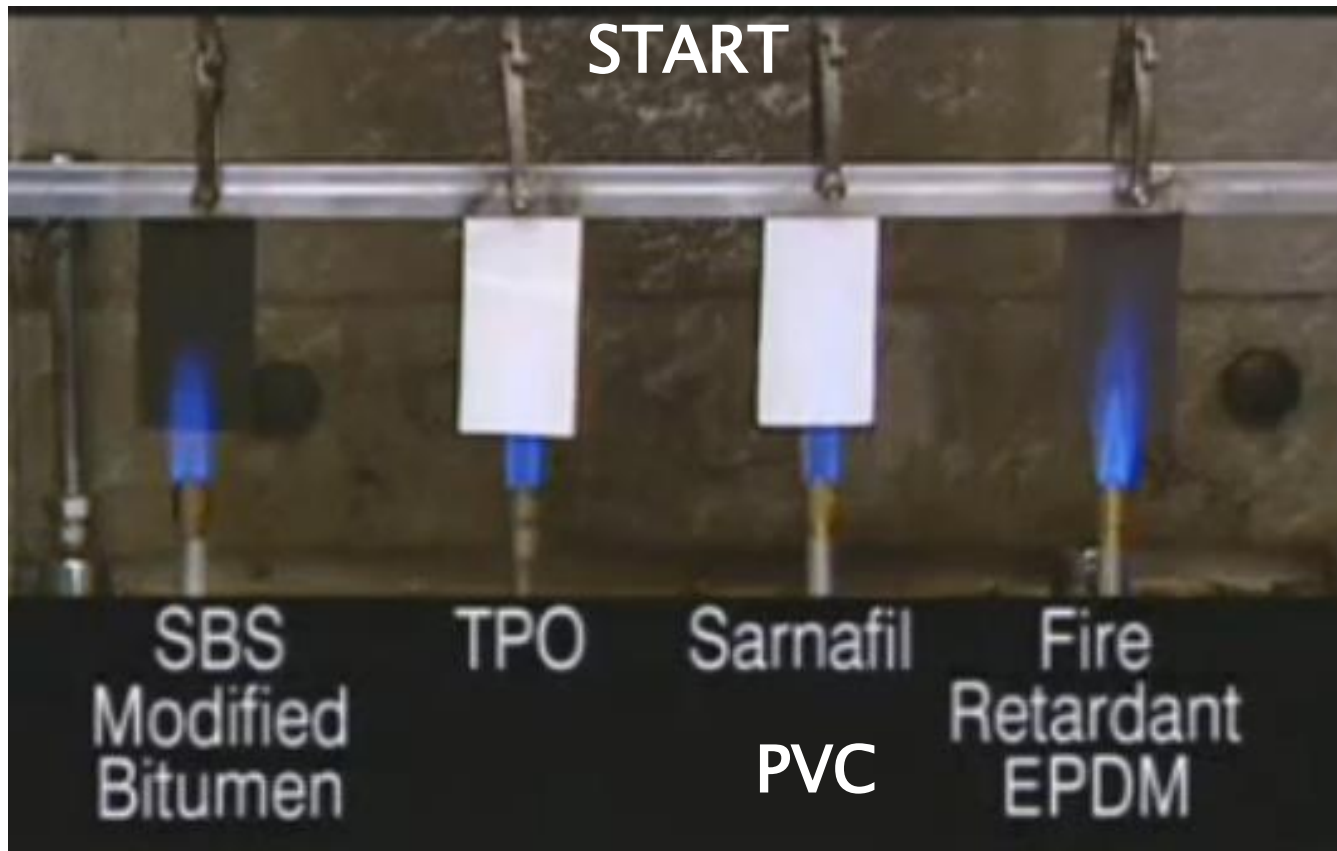
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Modified vs TPO vs PVC vs EPDM

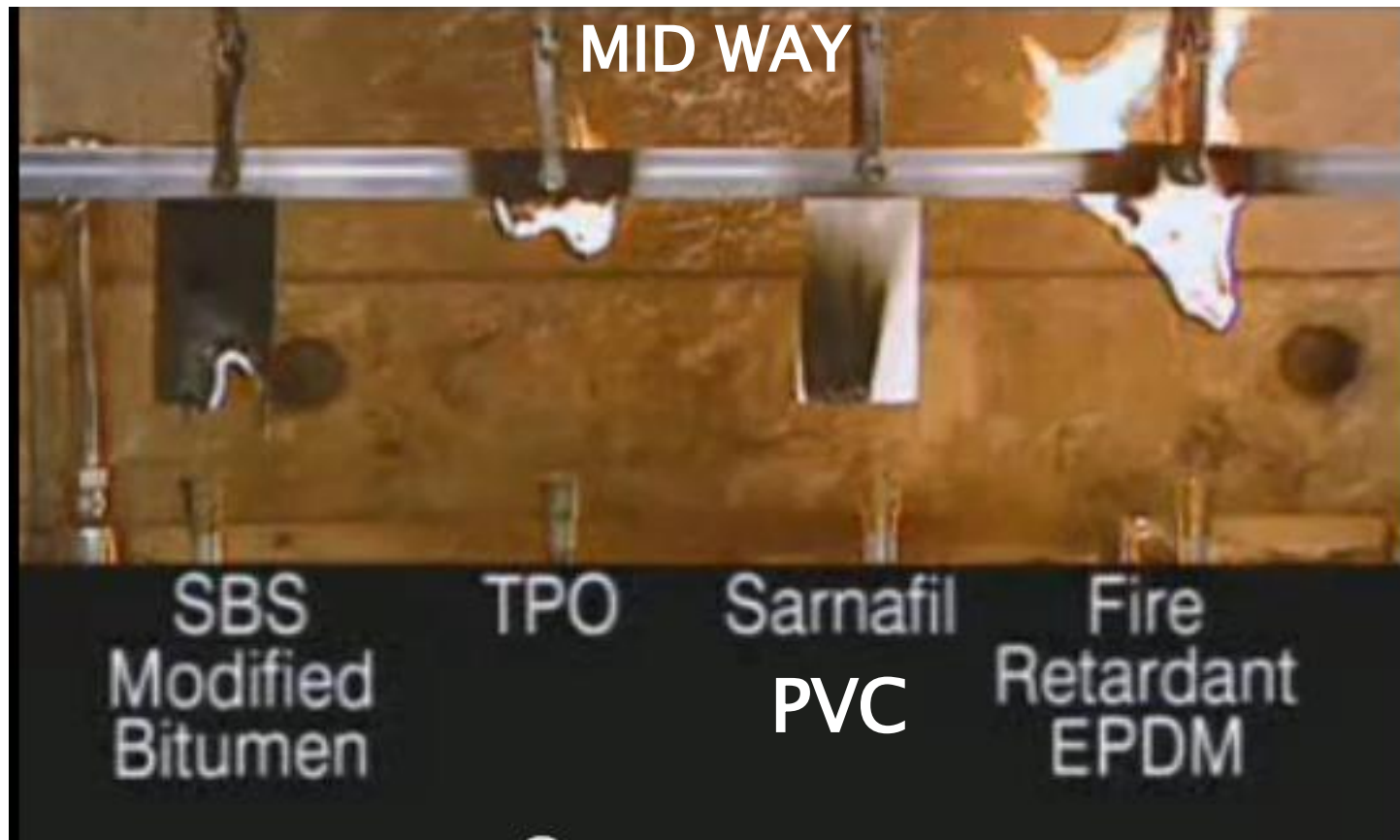
Fire performance of Modified vs TPO vs PVC vs EPDM



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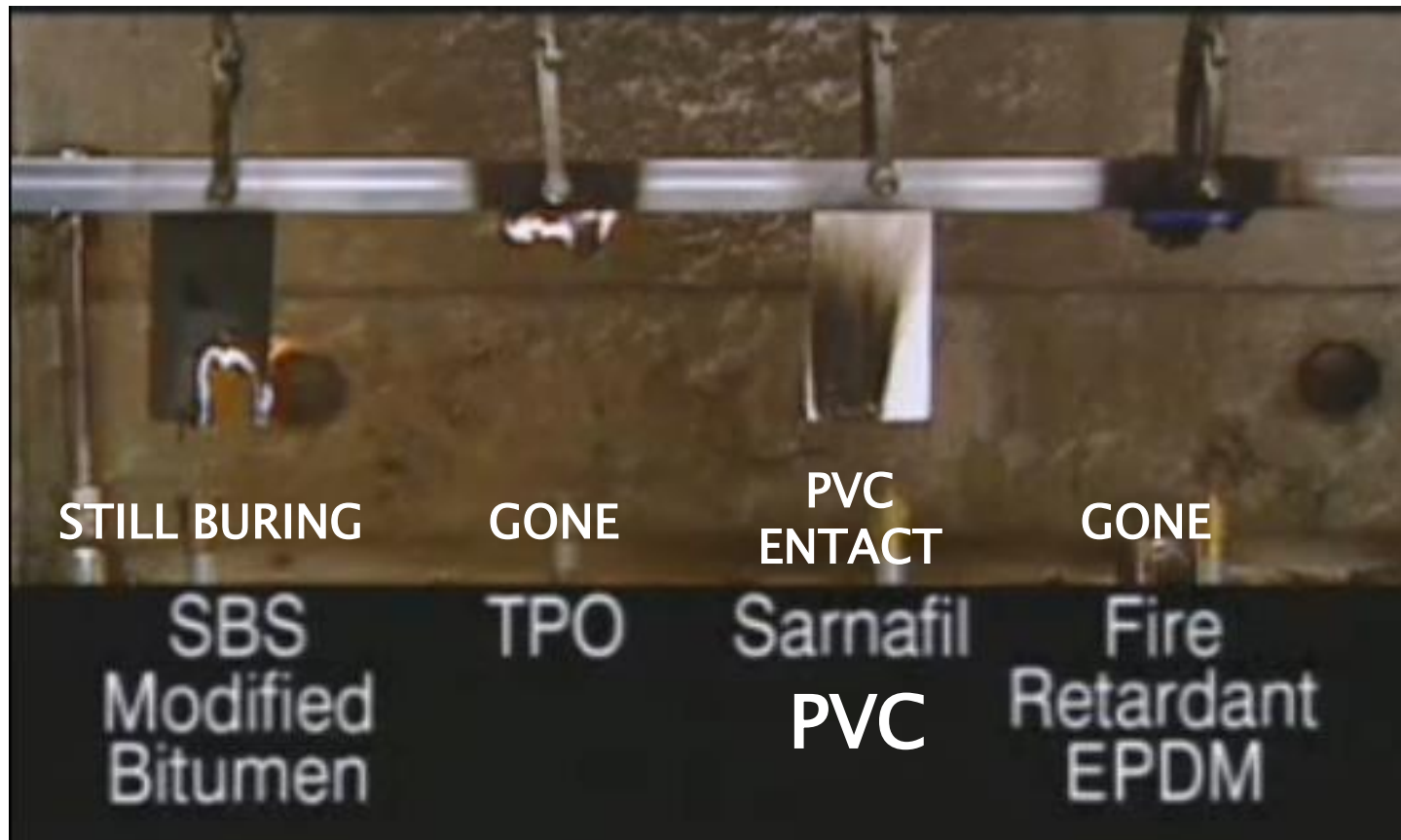
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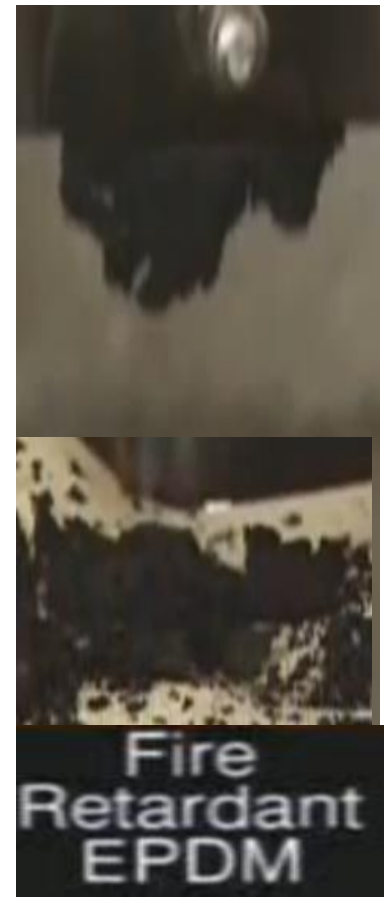
Modified Bitumen



TPO



PVC



Fire
Retardant
EPDM

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Cool Roof Rating Council

PVC was evaluated by the Cool Roof Rating Council and earned one of the highest reflective ratings for roofing membranes after a 3 year study and qualifies under Title 24 in California.

By applying a top finish on its roofing membranes, they stay cleaner longer, increasing the years of reflectivity and reducing energy consumption.

**City of Toronto now requires exclusively a
'Cool Roof' or 'Green Roof'
on all new buildings.**