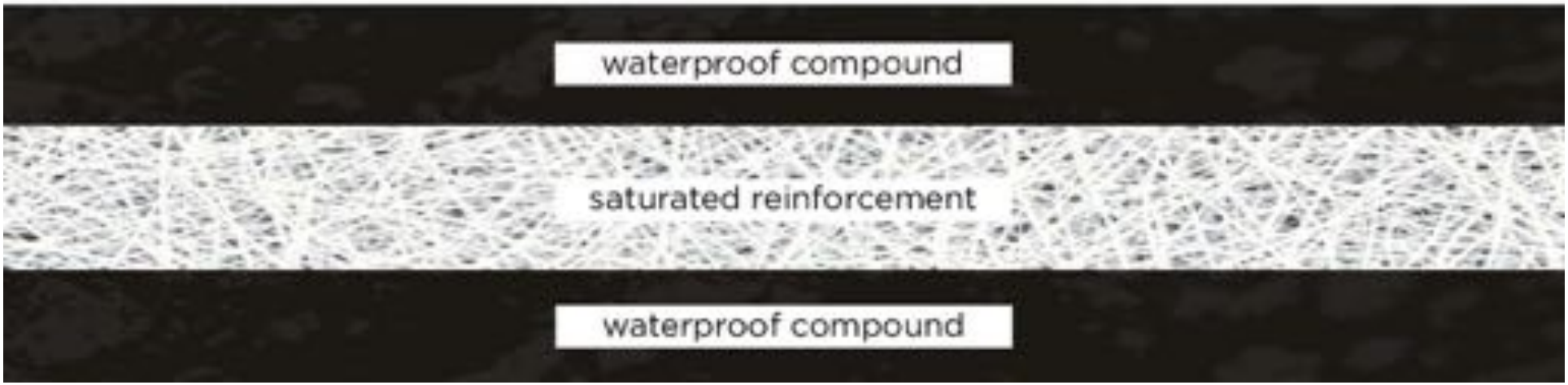

sbs membranes
sbs membranes
Performance characteristics
of SBS membranes


OUTLINE
Components of SBS membranes
Waterproof compound
Factors of aging
Reinforcements
New CSA standard

COMPONENTS
OF SBS MEMBRANES

- Waterproof Compound
- Reinforcements
- Surfacing

COMPONENTS
OF SBS MEMBRANES



WATERPROOF
COMPOUND

- Principal ingredient
- Responsible for water resistance
- Its quantity and quality will impact durability

WATERPROOF
COMPOUND

SBS-modified-bitumen formulation

- Asphalt
- SBS Polymer
- Filler
- Additives (fire retardants, tackifiers, etc.)

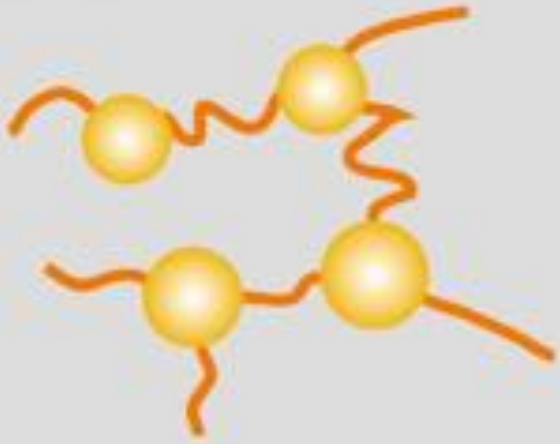
ASPHALT

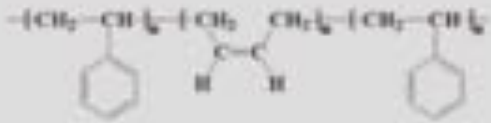
- Obtained from crude oil
- Produced in refineries
- Supply is tighter every year
- Oil companies install cokers
- Quality of asphalt varies



SBS POLYMER

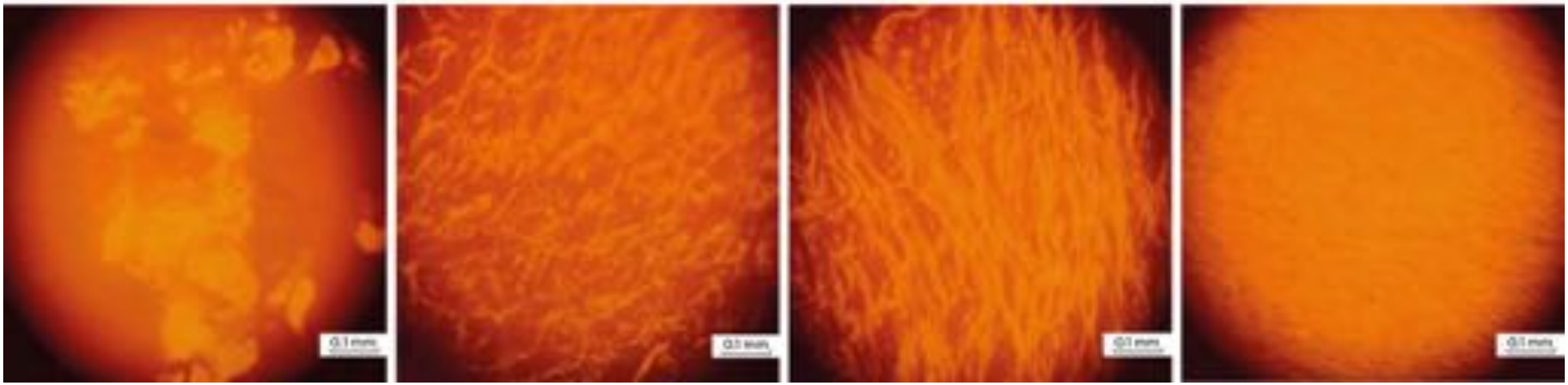
- SBS stands for Styrene-Butadiene-Styrene
- Block copolymer (hard block – soft block)
- Thermoplastic elastomer
- Low variability
- International sourcing





SBS POLYMER

Polymer swelling and phase inversion



FILLER

- Filler is an inert material
- Typical fillers: limestone, dolomite
- Local sourcing
- Reduces cost
- Essential ingredient

INGREDIENTS ARE CHANGING

- Asphalt quality has evolved
- Oil companies are typically quiet about changes
- Asphalt suffers the most variability
- Extreme cases require compatibilizers
- Manufacturers must adapt their formulations

BEYOND
THE NUMBERS

- SBS and filler contents
- Former European standard limited filler to 35% by weight
- Filler density has an impact

BEYOND
THE NUMBERS

- Performance matters, not recipes
- Beware of manufacturers with 20-year old formulas!

FACTORS
OF AGING

- Aging mainly acts on waterproof compound
- Major factors of aging are heat and oxygen
- UV exposure plays a marginal role

FACTORS
OF AGING

- Accelerated aging is performed in dark ovens
- 3 to 6 months at 70ºC

ACCELERATED AGING

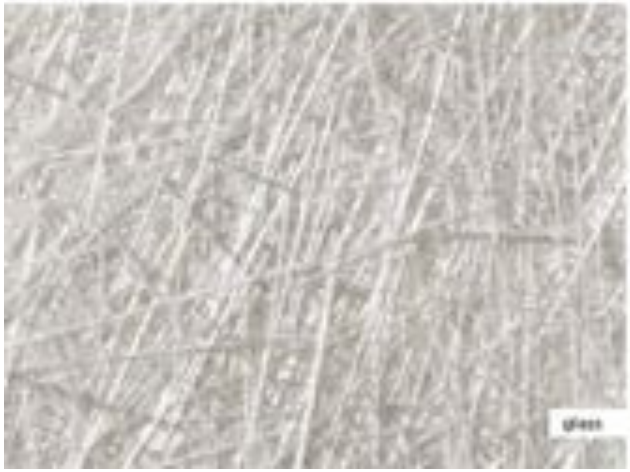
- Asphalt paving industry developed the PAV
- Combination of heat and oxidation
- Get a preliminary answer in less than 3 days!

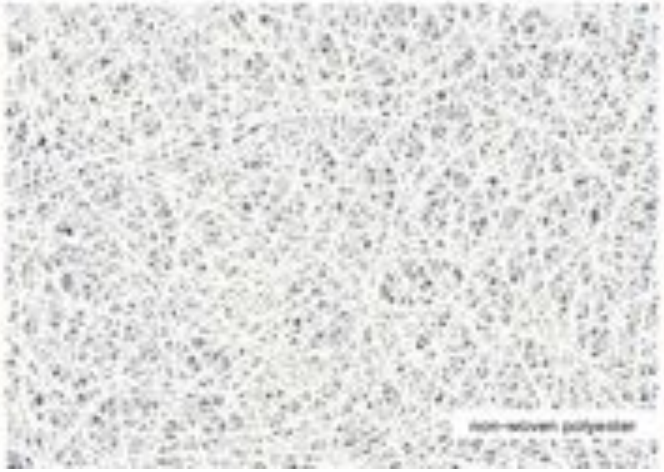


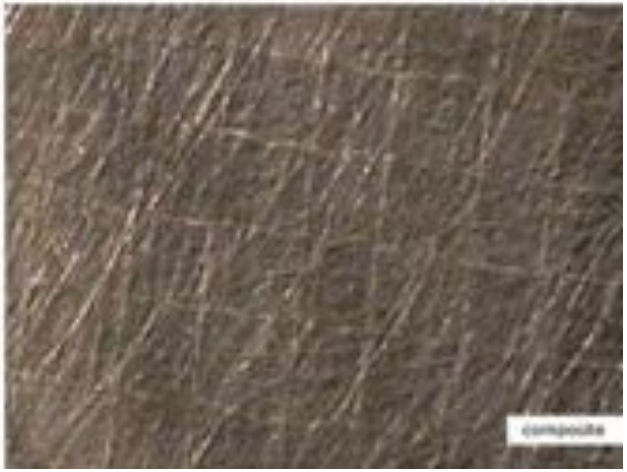
REINFORCEMENTS

- Three "families" of reinforcements
  - Glass
  - Non-woven Polyester
  - Composite
- Preferences are regional

EACH WITH THEIR OWN FEATURES







REINFORCEMENT
SATURATION

- Most reinforcements are fibrous mats
- Saturation eliminates air and moisture
- Some mats are "tighter" than others
- Done using a low-viscosity fluid (various options)

REINFORCEMENT
SATURATION

- Incomplete saturation leads to blistering
- Excessive saturation creates stability issues
- Some reinforcements are challenging

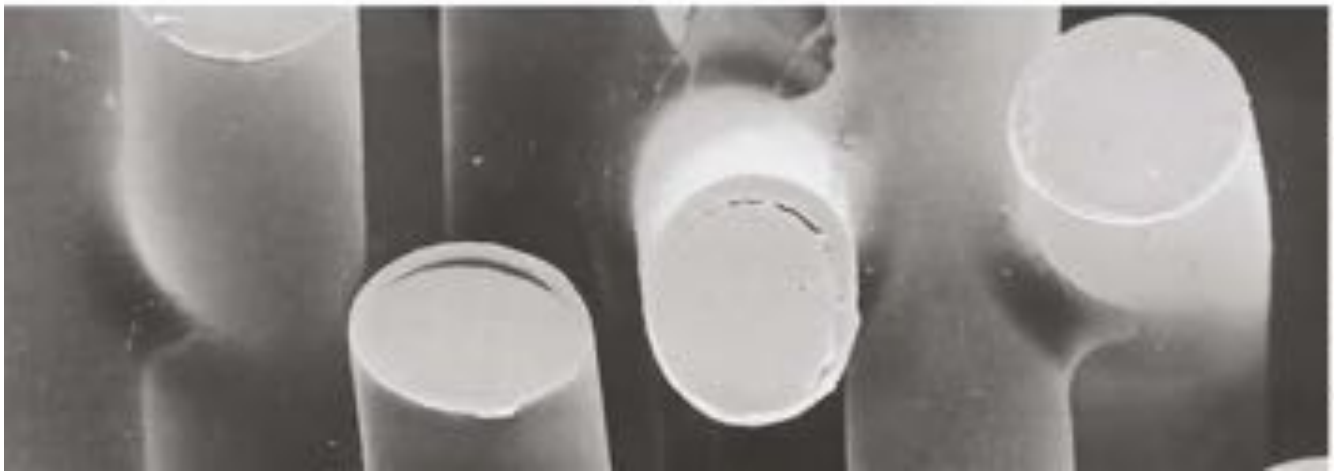
INCOMPLETE SATURATION

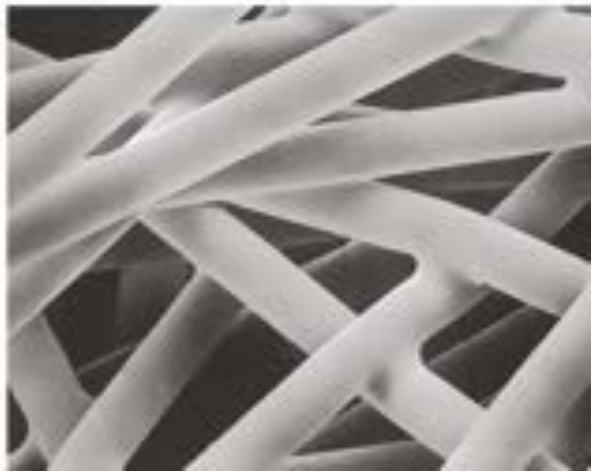
Incomplete saturation leads to blistering

COMPOSITE
REINFORCEMENTS

- Combine benefits of glass and polyester
- At equal strength, they are thinner and more open

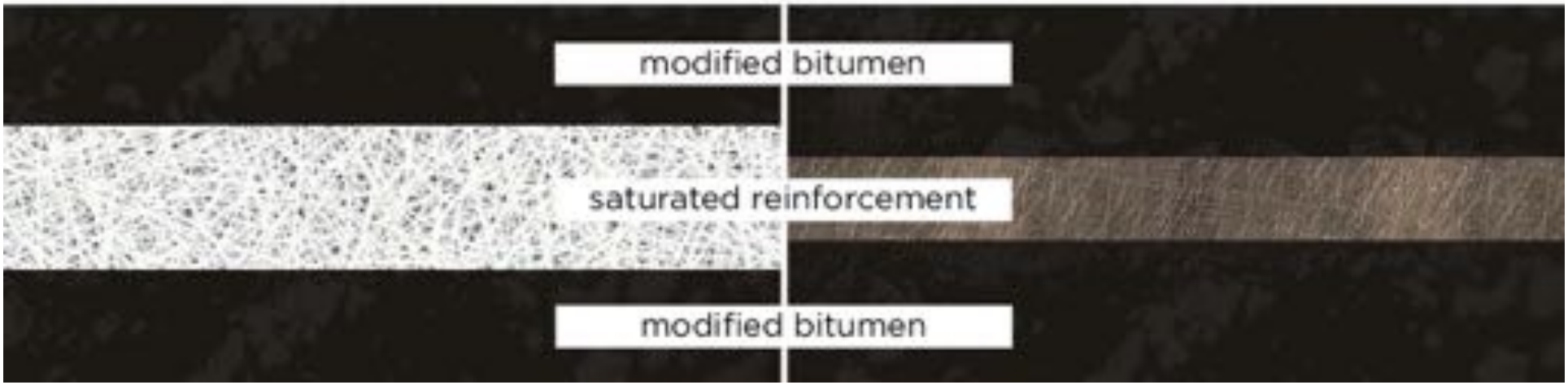
* Images courtesy of BONAR inc.





COMPOSITE
REINFORCEMENTS

- Provide more waterproof compound (10 to 30%)
- Introduced as early as 1996



COMPOSITE
REINFORCEMENTS

- Enhancement of wind-uplift resistance (CSA A123.21)
- Composite-reinforced system (18" o.c.) : 75 psf
- Polyester-reinforced system (18" o.c.) : 45 psf

COMPOSITE REINFORCEMENTS

- Composite-reinforced SBS sheets offer best performance
- Recognized by their own standard (ASTM D6162)
- ASTM D6163 covers glass-reinforced, D6164 for polyester-reinforced
- Will also have a specific type in new CSA standard

NEW
CSA STANDARD

- Specification for SBS roof membranes
- CSA A123.23 replacing CGSB 37-GP-56M
- Currently under public review period
- Expected to be released this Spring

NEW
CSA STANDARD

Classifications related to reinforcement

- Type A – Glass-reinforced sheets
- Type B – Polyester-reinforced sheets
- Type C – Composite-reinforced sheets

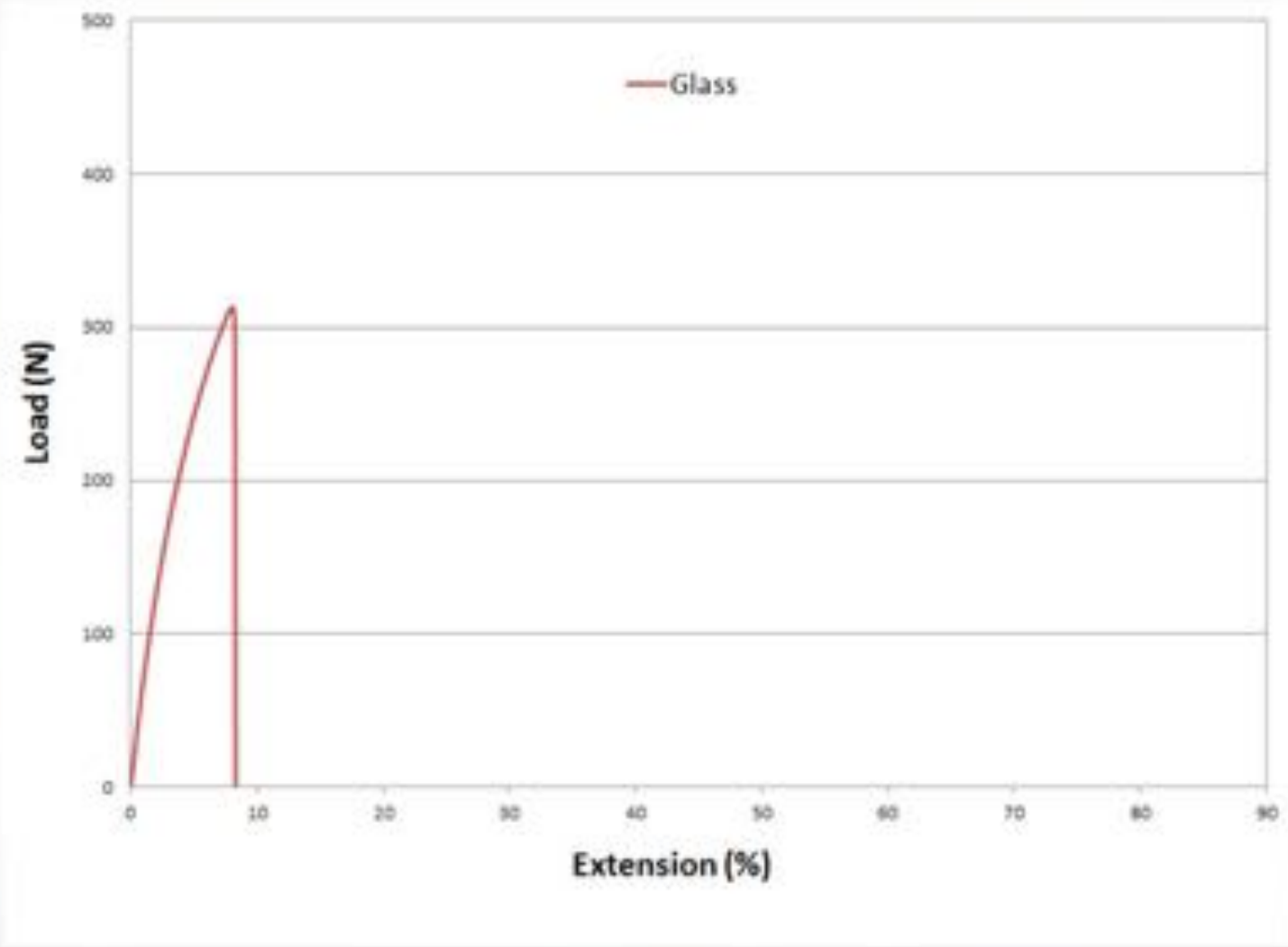
NEW
CSA STANDARD

- CSA A123.23 mostly relies on ASTM test methods
- UV weathering and heat aging are required
- Standard will be simple to use and will include both SBS and APP

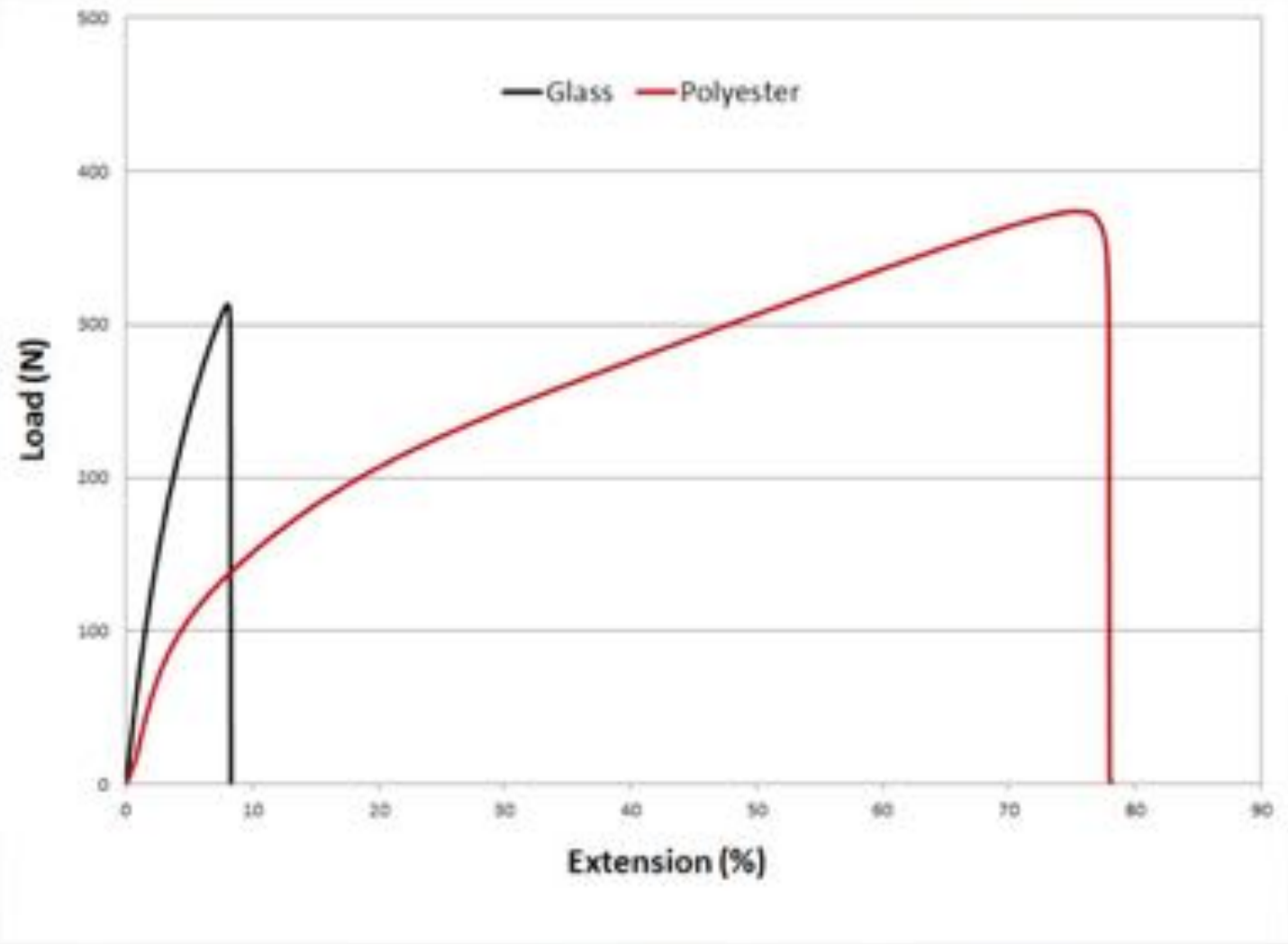
NEW
CSA STANDARD

- CSA A123.23 brings back the Strain Energy concept
- Minimum strain energy values must be met

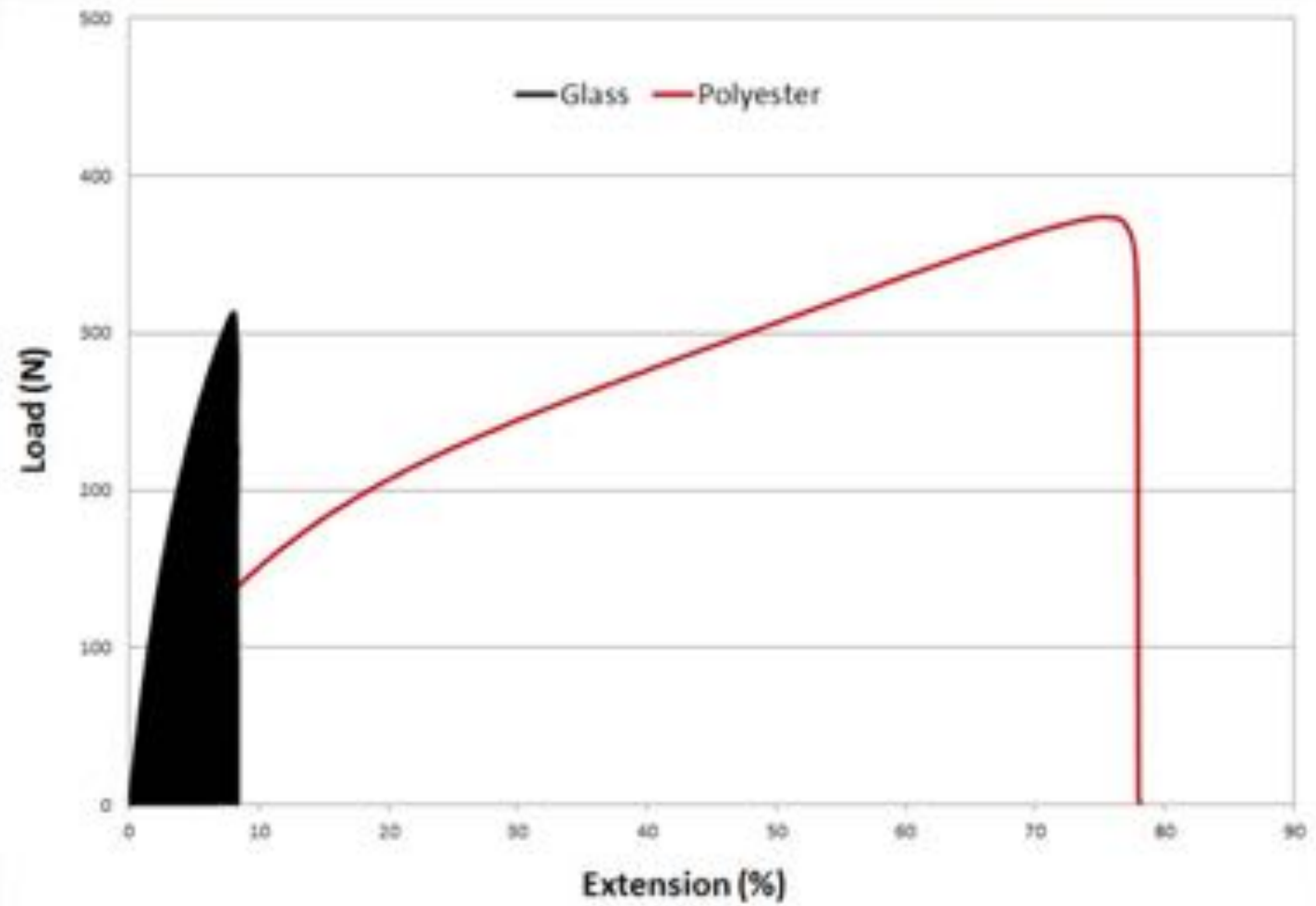
STRAIN ENERGY



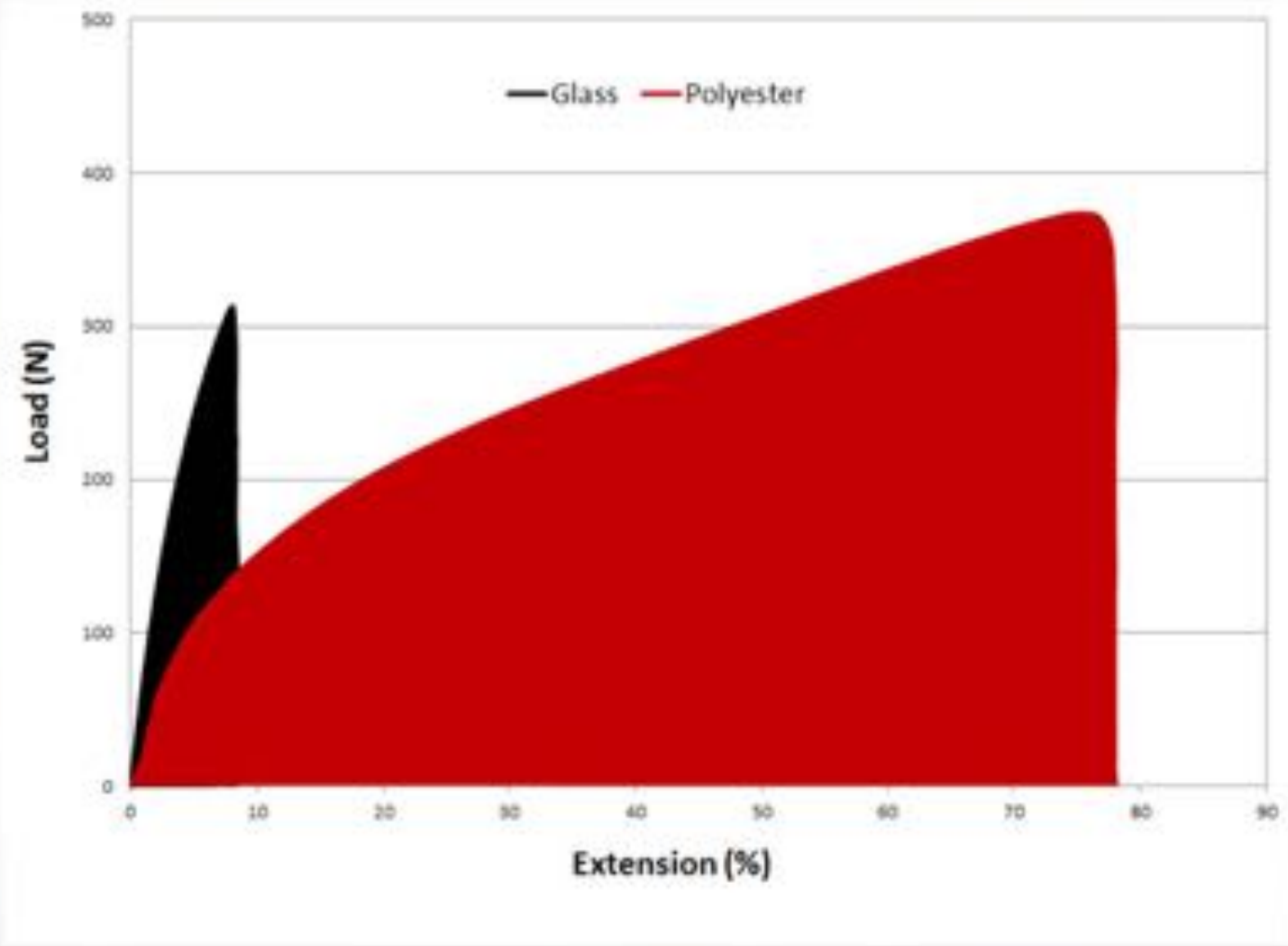
STRAIN ENERGY



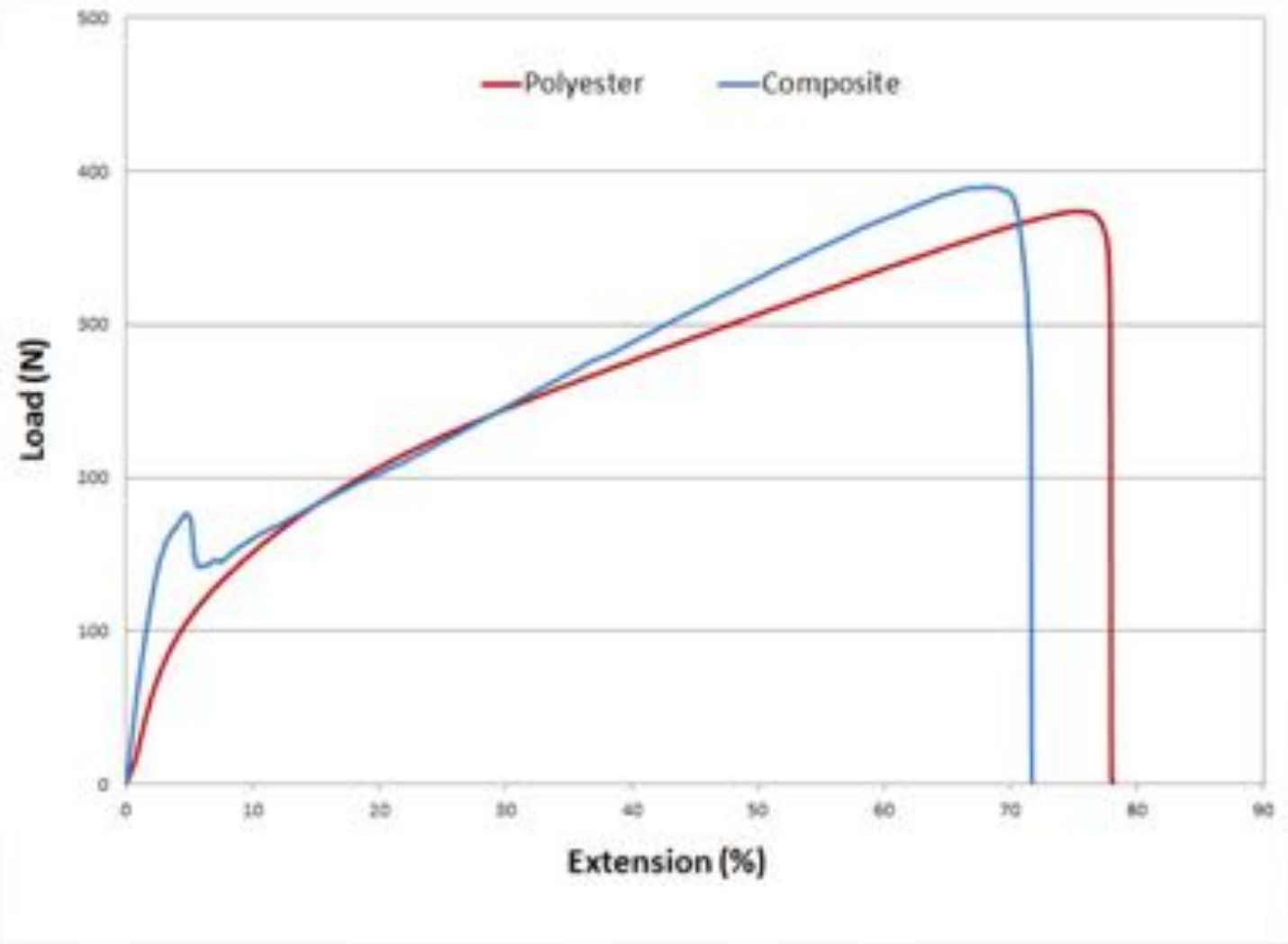
STRAIN ENERGY



STRAIN ENERGY



STRAIN ENERGY




Thank you

INTRODUCTION INTO
THE NBCC 2015 REVISION

Canadian Commission on Building and Fire Codes

PROPOSED CHANGE

[5.2.2.2.] **5.2.2.2. Determination of Wind Load**

(See Appendix A.)

[1] 1) This Article applies to the determination of wind load to be used in the design of materials, components and assemblies, including their connections, that separate dissimilar environments or are exposed to the exterior, where these are

[a] a) subject to wind load, and

[b] b) required to be designed to resist wind load.

[2] 2) Except as provided in Sentence (3), the wind load referred to in Sentence (1) shall be 100% of the specified wind load determined in accordance with Article 4.1.7.1.

[3] 3) Where it can be shown by test or analysis that a material, component, assembly or connection referred to in Sentence (1) will be subject to less than 100% of the specified wind load, the wind load referred to in Sentence (1) shall be not less than the load determined by test or analysis.

[4] --) Except as provided in Sentence (5), the wind uplift resistance of membrane roofing assemblies shall be determined in accordance with the requirements of CSA A123.21, "Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane-roofing Systems." (See Appendix A.)

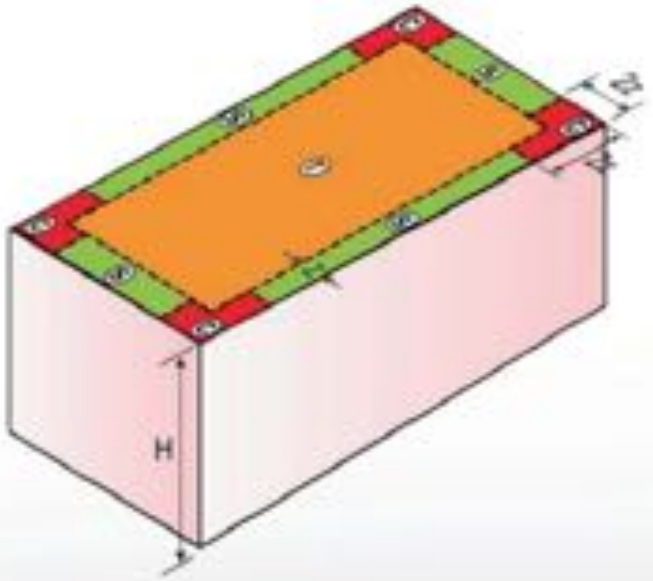
[5] --) Membrane roofing assemblies with proven gust performance for the anticipated wind loads need not comply with Sentence (4). (See A-5.1.4.1.(4) in Appendix A.)

HOW TO USE
THE STANDARD FOR AN ACTUAL ROOF

From that data collection we receive a roof with pressures associated to specific areas

Roof wind loads

Roof area	Wind load
End zone width, Z	5 ft (1.5 m)
Corner, ©	-45 psf (-2.2 kPa)
Edge, ⑤	-29 psf (-1.4 kPa)
Field, ⓡ	-19 psf (-0.9 kPa)



HOW TO USE
THE STANDARD FOR AN ACTUAL ROOF

1.2 REFERENCE STANDARD(S)

- Submit a report or reports, issued by a certified materials testing laboratory, attesting that the roofing system offered, was tested in accordance with:

  CSA A123.21-14 Standard Test Method for the Dynamic Wind Uplift Resistance of Roofing Systems

  Test results shall demonstrate that the roofing system sustained wind uplift pressures of

  [ ]kPa for the field of the roof
  [ ]kPa for the edge of the roof and
  [ ]kPa for the corners of the roof

MATCHING ASSEMBLY

Roof System Assessment Report of Wind Uplift Resistance

LLS Document Number:	PUB-DRU168540
Publication date:	December 5, 2010
Revised:	
Revaluation:	December 5, 2013

Manufacturer:

SOPREMA INC.

Authorized membrane production sites: Drummondville, QC, Chilliwack, BC, Wadsworth OH, Gulfport MS

Roofing System Summary: « Sopralix Base 630 »

- Cap sheet membrane:	Sopralix Cap-650 or equivalent membrane
- Base sheet membrane:	Sopralix Base-630
- Support panel:	Optional
- Insulation:	Polyisocyanurate or equivalent product
- Vapour barrier:	Sopravap'r or equivalent membrane
- Thermal barrier:	Optional
- Decking:	Steel deck 22 gauge or equivalent

- Dynamic Uplift Resistance (DUR) as per CSA A123.21 standard:
  - System A: -6.2 kPa (-130 psf)
  - System B: -3.4 kPa (-70 psf)
  - System C: -2.4 kPa (-50 psf)
  - System D: -2.0 kPa (-42 psf)