

STUDY:










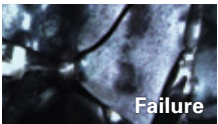

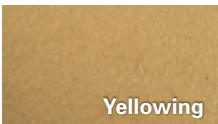

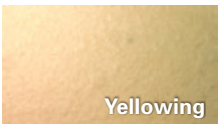
Heat-aged Performance

PRODUCTS:

Firestone UltraPly™ TPO vs. PVC

The new TPO ASTM D6878 standard for heat aging is now more stringent than both EPDM and PVC test methods. Based on these competitive ASTM testing standards, UltraPly TPO largely outlasts its closest PVC competitor.

Competitive testing was conducted at 275° F to represent extreme conditions.

	After 2 Weeks	After 3 Weeks	After 4 Weeks	After 5 Weeks
PVC #1	 Yellowing	 Yellowing	 Yellowing & crazing	 Failure
PVC #2	 Yellowing	 Yellowing	 Yellowing	 Failure
PVC #3	 Browning & curling	 Failure		
Firestone UltraPly TPO (45 mil)	 Yellowing	 Yellowing	 Yellowing	 Yellowing

Firestone UltraPly TPO lasted 3 times longer than PVC*



*Conducted in the Firestone Research and Development Labs in Carmel and Beech Grove, Indiana, in accordance with ASTM standards

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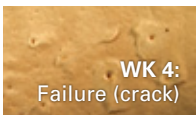



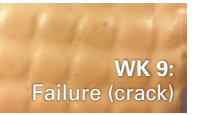


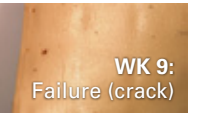

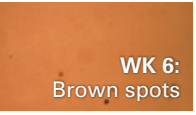
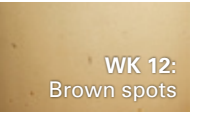
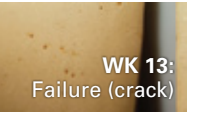

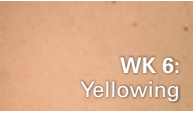

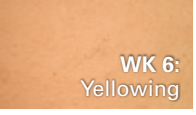


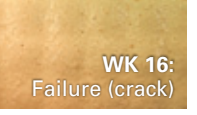
Heat-aged Performance

PRODUCTS:

Firestone UltraPly™ TPO vs. TPO Competitors

The new TPO ASTM standard for heat aging extended the testing period from four weeks to 32 weeks at 240°F. This increase is more stringent than both the EPDM and PVC test methods. The new ASTM method also requires TPO membranes to retain 90% of their original properties.

Competitive testing was conducted at 275° F to represent extreme conditions.

TPO #1	 WK 3: Yellowing	 WK 4: Failure (crack)	Competitive testing of materials at 275°F per NRCA recommendation. Failures ranged from 3-16 weeks.		
TPO #2	 WK 3: Yellowing	 WK 4: Failure (crack)			
TPO #3	 WK 3: Yellowing	 WK 6: Brown spots	 WK 7: Waffle appears	 WK 8: Waffle pattern	 WK 9: Failure (crack)
TPO #4	 WK 3: Yellowing	 WK 6: Brown spots	 WK 7: Waffle appears	 WK 8: Waffle pattern	 WK 9: Failure (crack)
TPO #5	 WK 3: Yellowing	 WK 6: Brown spots	 WK 9: Yellowing, tan	 WK 12: Brown spots	 WK 13: Failure (crack)
TPO #6	 WK 3: Yellowing	 WK 6: Yellowing	 WK 9: Brown spots	 WK 12: Brown spots	 WK 13: Failure (crack)
Firestone UltraPly TPO (45 mil)	 WK 3: Yellowing	 WK 6: Yellowing	 WK 9: Waffle appears	 WK 12: Waffle pattern	 WK 16: Failure (crack)

Firestone UltraPly TPO lasted 12.5% longer than the closest competitor*



*Conducted in the Firestone Research and Development Labs in Carmel and Beech Grove, Indiana, in accordance with ASTM standards