

2001 Co. Severe Hail Damage Testing

Koontz Associates Engineering Hobbs New Mexico

An Air Gun Shoots 1", 2", or 3" Hail Balls at a roofing

Membrane
And substrait
chilled to

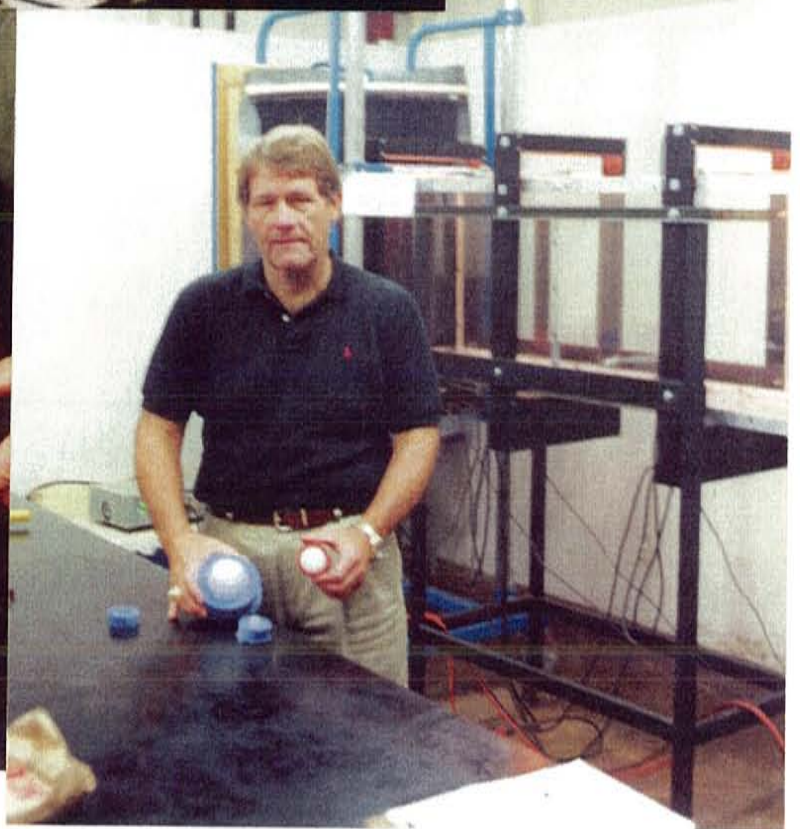
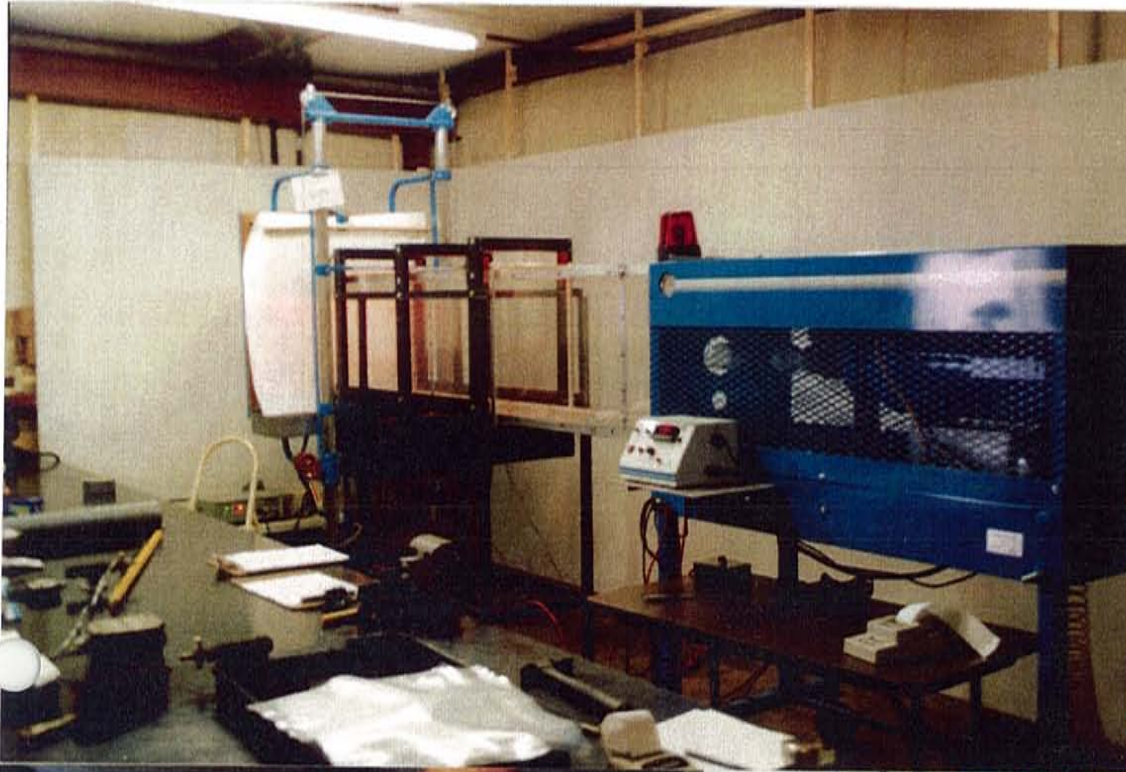
36° to 40°F

At 60 mph

90 mph

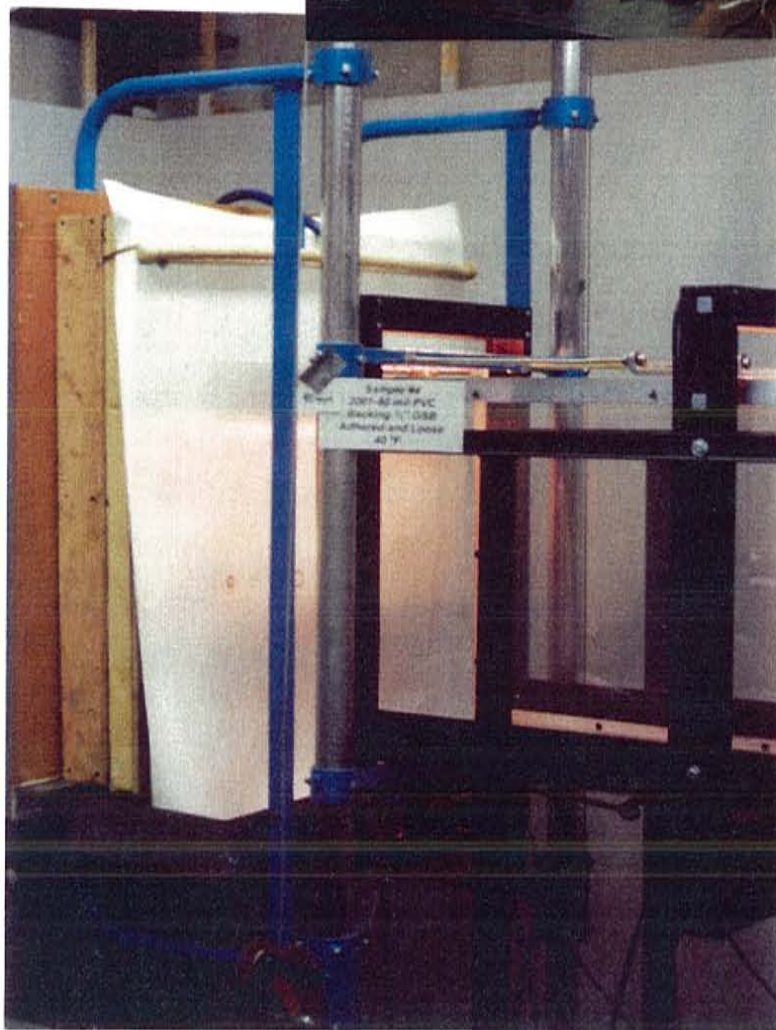
120 mph

150 mph



2001 Co. Severe Hail Damage Testing

The Koontz engineering hail gun shoots various sizes hail balls at a cooled 38°F roof assembly surface



An air cannon above shoots a hail ball through a 10" speed recording chamber at a roof surface

Notice how the PVC roof membrane is cooled with a spray of 38°F water.

The hail impact area is forensically examined for damage and the results are reported accordingly.

John Hatfield The 2001 Engineer

Prepares Test samples



Over 3" Hail at 90 to 120 mph
On loose 1/2 Dens Deck over
2" ISO with 90 mill plus C-EPDM

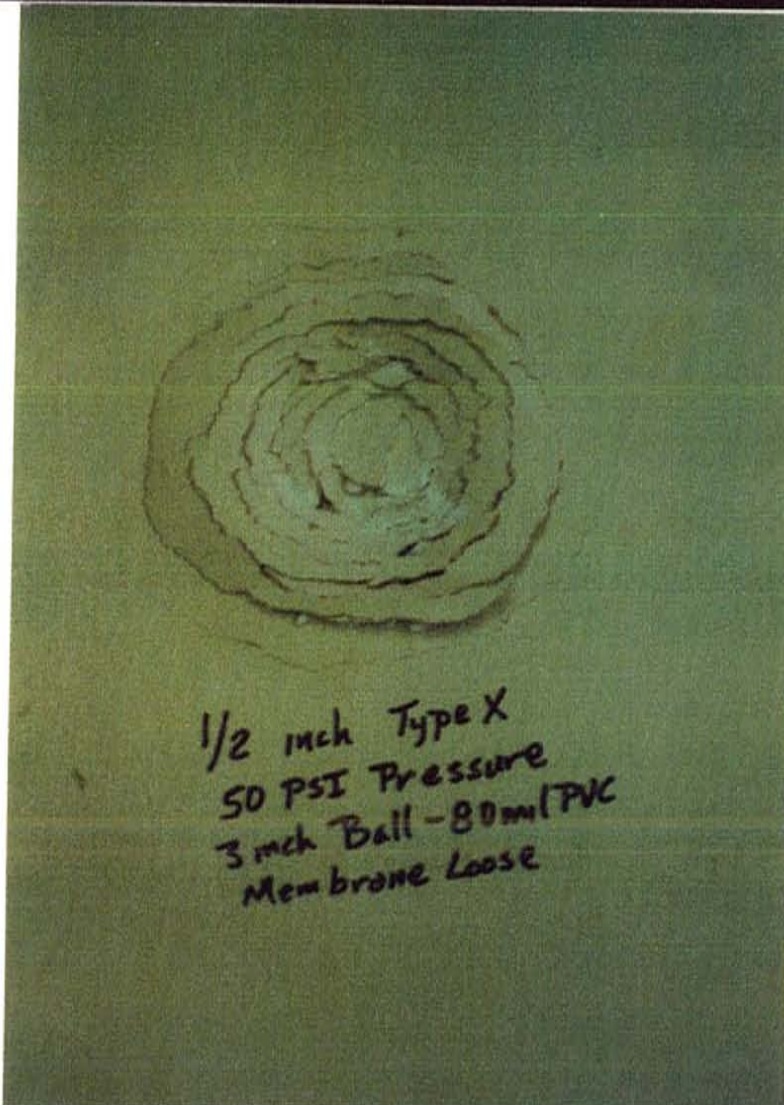


Notice 3" hail
impact into
1/2" OSB water
board at 120
miles per hour
No C-EPDM
Damage.

80 mill Reinforced PVC over 1/2 " Gypsum



90 mph
120 mph
150 mph
Miles per
Hour



The hail ball impact into the 1/2 gypsum on 2" ISO acts like a catchers mitt and crushes in concentric rings adsorbing the impact energy of the hail ball and the 2" ISO has sufficient elasticity to be pushed in and then push out the gypsum impact energy.

2" Hail Resistance of 2001 Co.

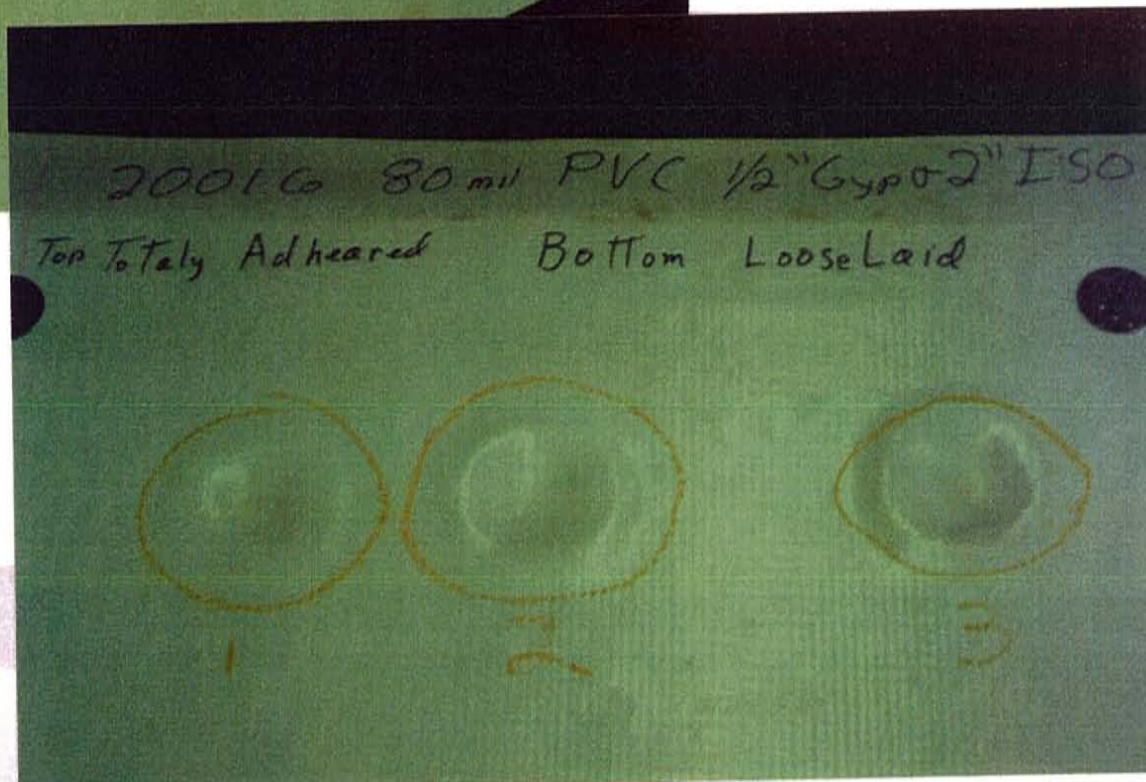
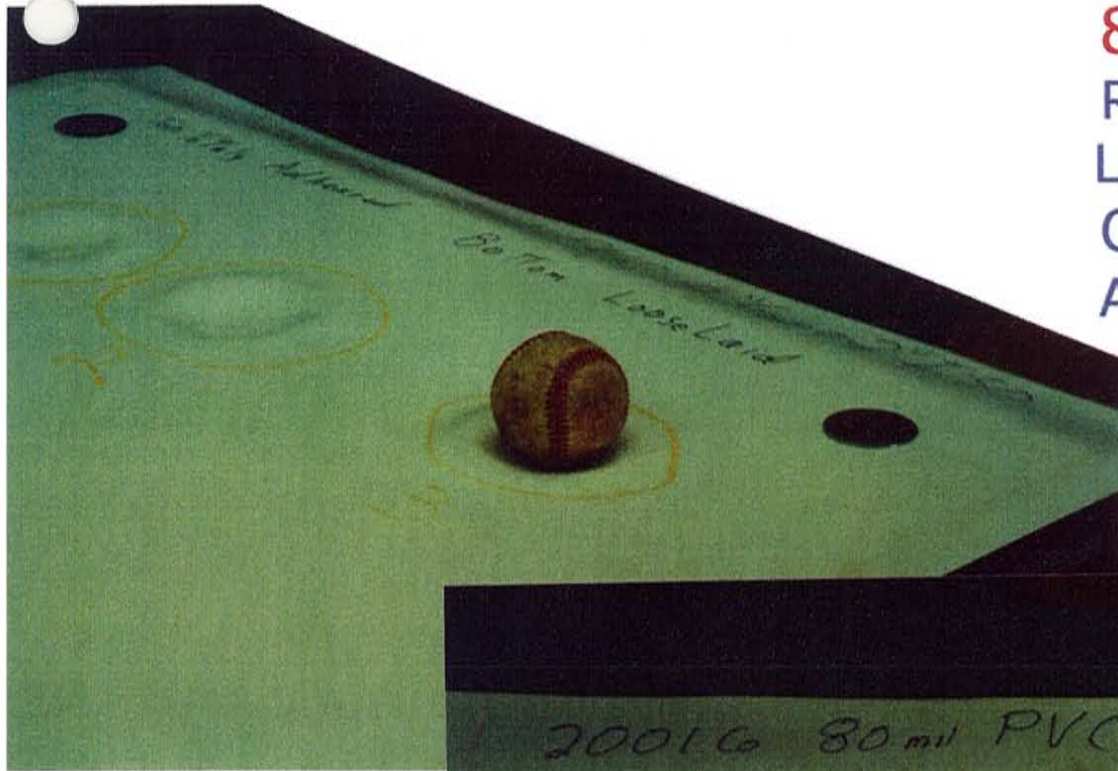
80 Mil PVC

Roof Membrane

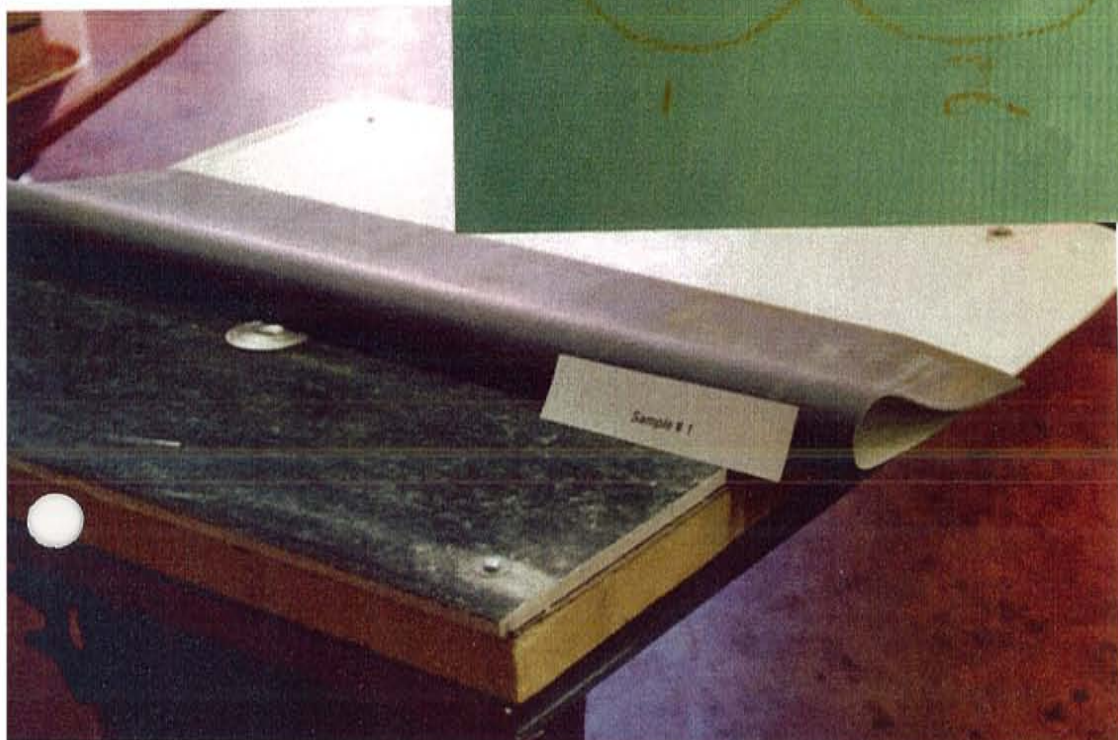
Loose laid

Over 1/2" Gypsum

And 2" ISO



2" Hail Impact
At 60 mph
90 mph
120 mph



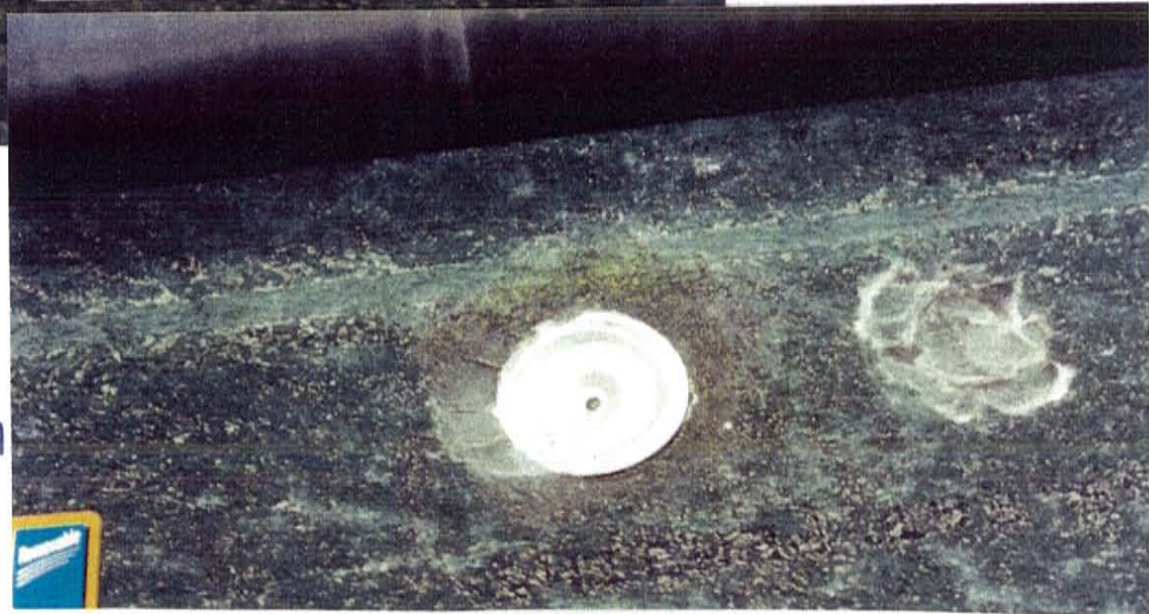
2001 Co.
Offers 2" Hail
Warrantee Rider
With 80 mil
Or Thicker PVC

90 mil C-EPDM hit on fastener

Washers
Shows no
Membrane
Damage



3" Hail
Shot at
120mph



C- EPDM
90 Mil +
1/2" Gypsum
2" ISO