



LSAA

ENGINEERS AUSTRALIA

Presented By:
Mike Lester
Martin J. Augustyniak
14 October 2011

SEE FEEL HEAR



TENSO THERM™
INSULATED TRANSLUCENT MEMBRANE ROOFING SYSTEM MADE WITH nanogel

HISTORY OF INNOVATION



1940s
Walter Bird's Government Work



1960s
PTFE Fiberglass and NASA



1970 Japan Exposition
Air Supported



1972
First Commercial Project



1975
First Air Supported Stadium




HISTORY OF INNOVATION



1980
Largest Tension Membrane Structure



1992
Largest Cable Dome Stadium



1999
Largest Dome Structure



2002
Retractable Roof



2008
TIO2 Coated PTFE




RECENTLY COMPLETED



Durban Stadium



Nelson Mandela Bay Stadium



Greenpoint Stadium



Red Bull Arena

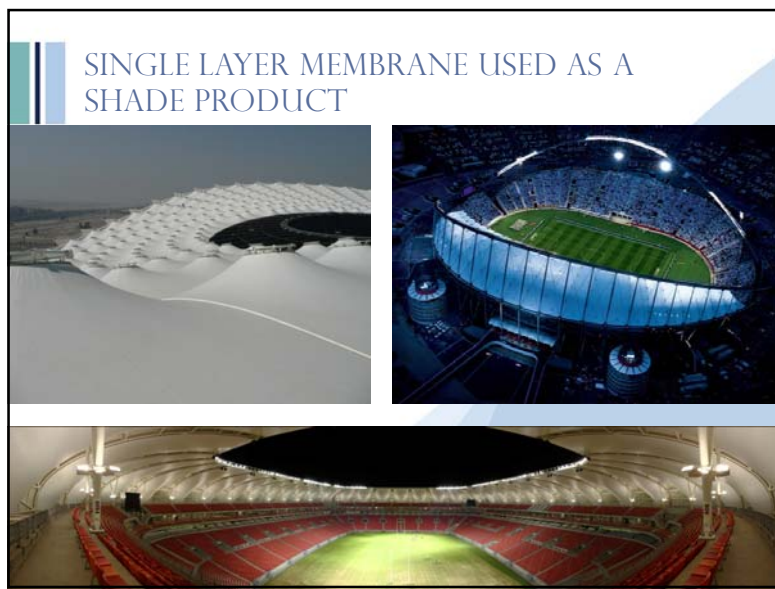
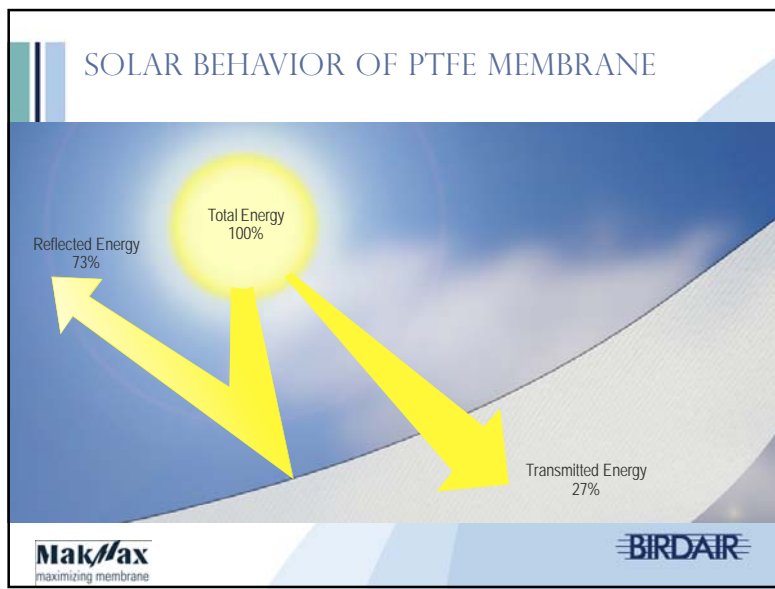


Jawaharlal Nehru Stadium



LaPlata Stadium



TENSO THERM™
INSULATED TRANSLUCENT MEMBRANE ROOFING SYSTEM MADE WITH nanogel

SEE HEAR

Introducing Aerogel:

- World's lightest solid (95% air)
- World's best insulating solid
- Made from abundant silica
- Highly translucent
- Hydrophobic - resists mold & mildew
- Outstanding acoustic dampening ability
- Reusable
- Manufactured by Cabot Corporation

Mak//ax maximizing membrane

BIRDAIR

ROOFING FOR LIVING™

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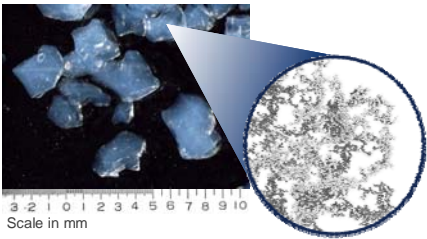
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Mak//ax BIRDAIR
maximizing membrane

TENSOTHERM™
INSULATED TRANSLUCENT MEMBRANE ROOFING SYSTEM MADE WITH nanogel

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- World's best insulating solid
 - 12 mw/m-K
 - U=0.56/25mm
 - Speed of sound 100 m/s
- Light weight
 - ~75 kg/m³
- Extremely water repellent
 - ~150° contact angle
- Highly porous
 - ~95% air
- Unique nanostructure
 - ~20 nm pores
- Very high surface area
 - ~750m²/g
- Translucent grades
 - ~50-70% light transmission per inch
- Sizes
 - 5µm to 5mm
- Easy handling
 - No mold, mildew, shelf life issues
 - Non-toxic, not readily combustible



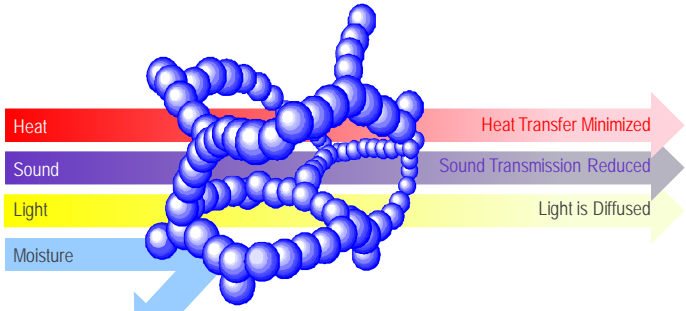
Scale in mm

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Heat Transfer Minimized

Sound Transmission Reduced

Light is Diffused

Moisture Repelled

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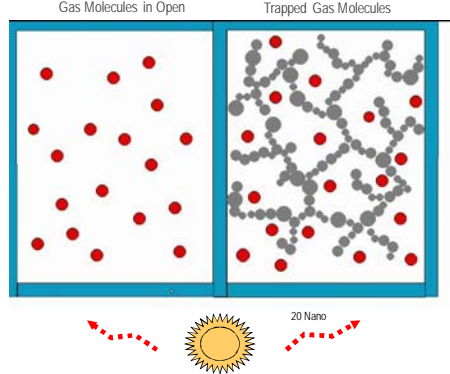
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Aerogel achieves high levels of thermal insulation by trapping air.

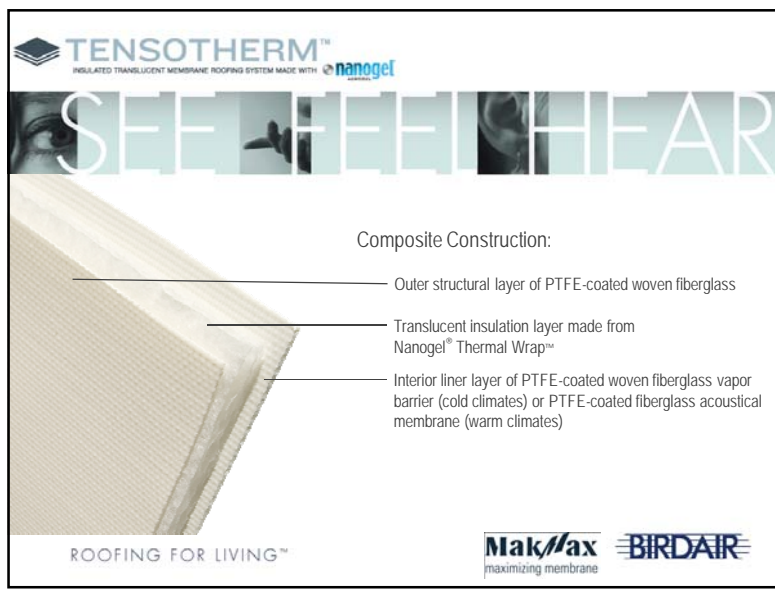
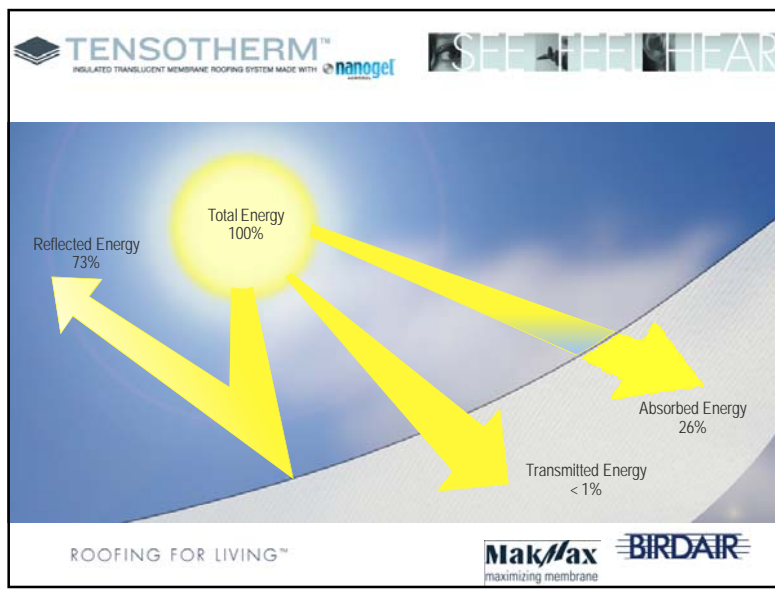
Gas Molecules in Open Trapped Gas Molecules



20 Nano

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TENSO THERM™
INSULATED TRANSLUCENT MEMBRANE ROOFING SYSTEM MADE WITH nanogel

Tensotherm uniquely provides invaluable benefits directly to people living and working under it, including:

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- Diffused glare-free natural daylight
- Enhanced temperature control, even in the most extreme environments
- Remarkable acoustics and noise dampening.

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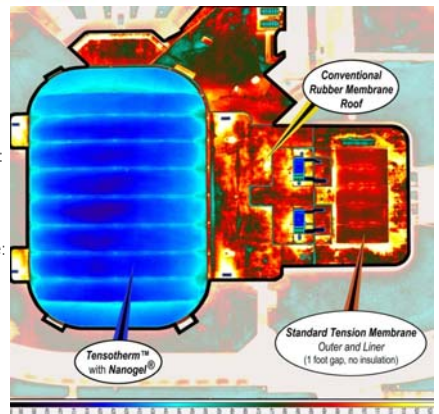
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An aerial thermograph of Dedmon Center reveals Tensotherm's robust insulating capability.

- Surface Temp. of Tensotherm Outside: -1° C (30° F)
- Surface Temp. of Tensotherm Inside: 20° C (68° F)
- Surface Temp. of Standard Membrane: 5° C (42° F)
- Outside Air Temp. : -3° C (27° F)




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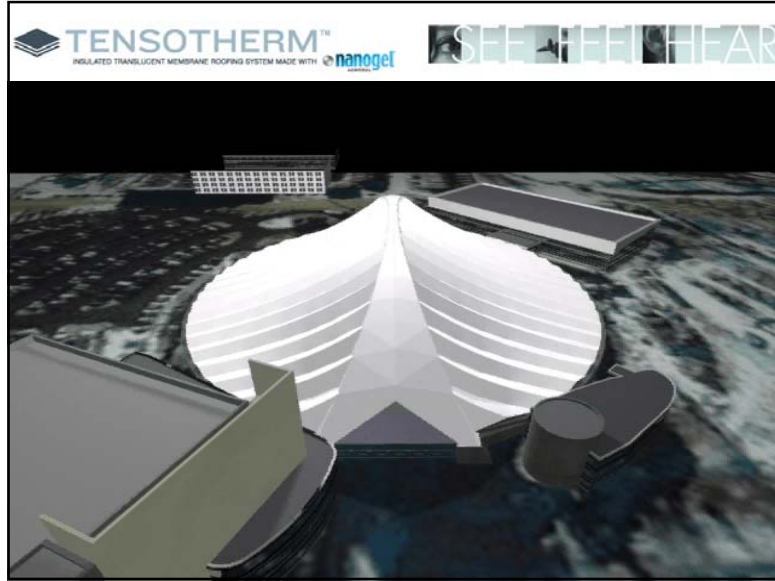
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Insulated membrane roof comparison of heat loss

March 2009 March 2010

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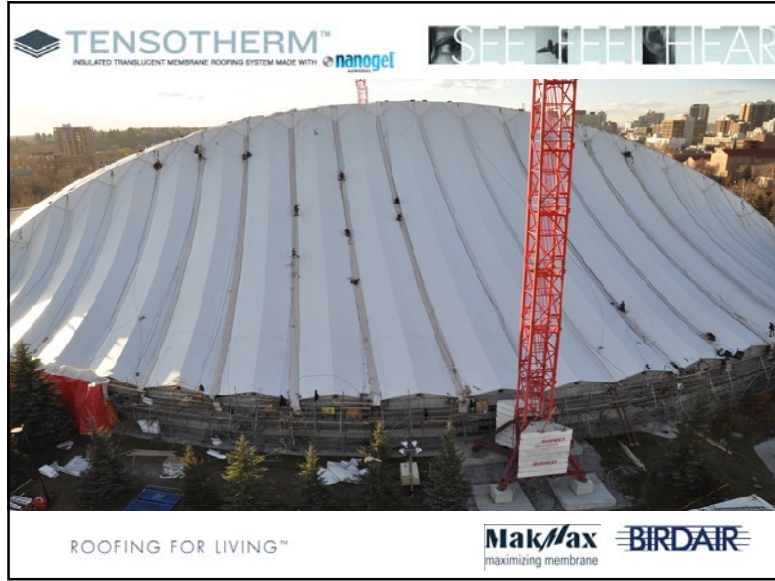


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4.0
-4.9

FLIR

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For more information about Tensotherm please visit us on the web at:

www.Tensothermroofing.com
www.Birdair.com
www.MakMax.com

Thank-You.

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