

Hüper Optik® Heritage

The Journey Begins...



1994

- 2 GMX appointed Fraunhofer Gelleschaft as technology partner.



1995

- 2 Titanium Nitride was founded by Fraunhofer as the new Ceramic-based material with spectrally selective performance.



1997

- 2 Hüper Optik GmbH was set up in Munich. Hüper Optik International, the corporate Headquarters was also established in Singapore.



1999

- 2 Southwall Technologies commenced trial production.
- 2 Hüper Optik USA was set up.



2000

- 2 C20, C30, C40, C50, C60 was commercialized.



2001

- 2 World's first and only nano-ceramic patent was awarded.



2004

- 2 C50 Shield passed Class 2 Bomb Blast Test.



2007

- 2 Southern Capital Group invested in Novomatrix Holdings.
- 2 500,000 sq ft of film was installed on the Royal Caribbean cruise liner.



2008

- 2 Premium Reflektor PR30, PR40 launched.
- 2 Hüper Optik received National Fenestration Rating Council certification.



2009

- 2 The ultimate front windscreen film, Ceramic 70, was launched.
- 2 Hüper Optik qualified for 2009 US Tax Credit.
- 2 C30 - the only retrofit window film featured by Popular Science magazine with energy saving properties.



2010

- 2 Launch of Nano-Ceramic 05 and 15, Klassisch Black series.
- 2 Launch of The Meisterone, Hüper Optik Concept Car.
- 2 10-Year of Meister Keramische Technologie - Global Anniversary Celebration.
- 2 Solutia Inc acquired Novomatrix.
- 2 Hüper Optik solar control window film was featured in the Asia Pacific Coatings Journal and the Polymers Paint Colour Journal.

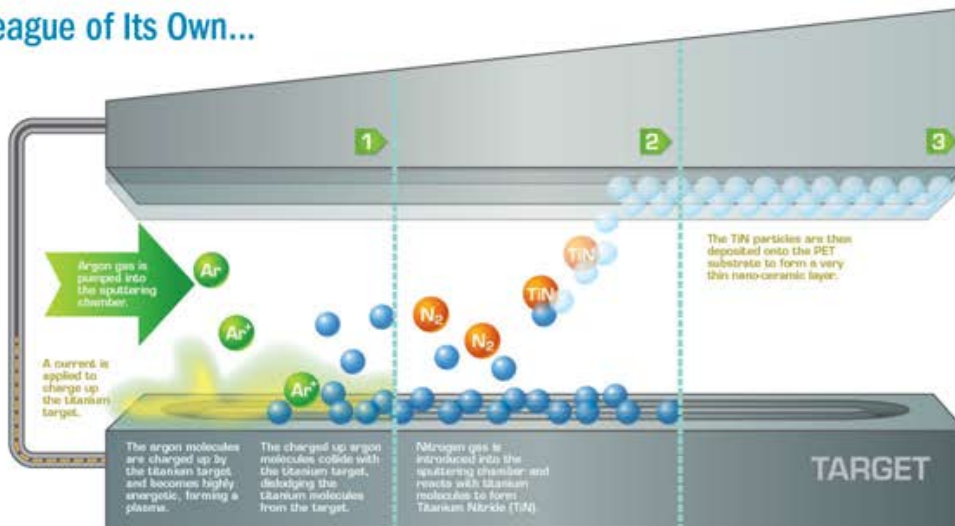


2011

- 2 Solutia Inc. acquired Southwall Technologies.

Nano-Ceramic Sputtering Process

X3 A League of Its Own...

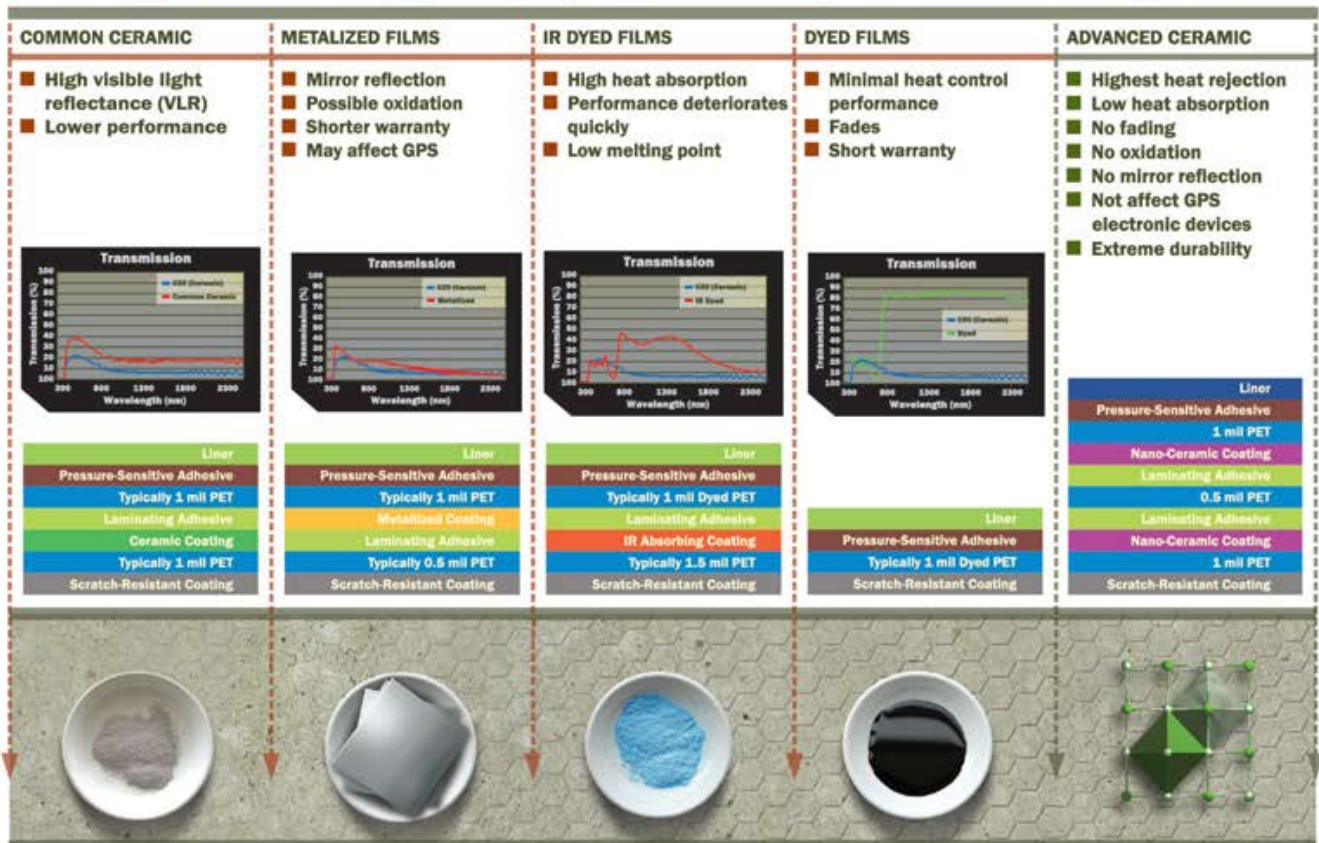


Competitive Edge

LEGEND

Liner	Laminating Adhesive	Ceramic Coating
Pressure-Sensitive Adhesive	Metallized Coating	Nano-Ceramic Coating
PET	IR Absorbing Coating	Scratch-Resistant Coating

X³ POWER



Power



Trail Blazing

1ST AND ONLY PATENTED NANO-CERAMIC FILM.

After six years of intensive research and development, US patent No. 6,188,512 Dual Titanium Nitride Layers For Solar Control was granted in February 2001. The combination of TiN layers selectively transmits a higher percentage of visible light than near infra-red energy, with a low visible light reflection. Get only the REAL Ceramic.



Performance

3 TIMES MORE INFRA-RED REJECTION (IRR) THAN DYED FILM.

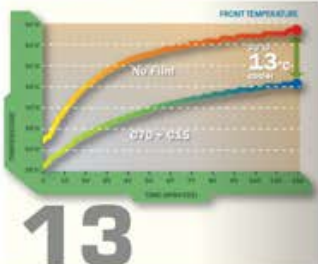
The unique optical property of Transition Metal Nitrides in thin film for spectrally selective performance was first explored by Carl Ribbing and co-workers in Uppsala University, Sweden. Titanium Nitride - a high performance refractory, super durable composition is capable of rejecting over 3 times more infra-red heat than conventional dyed products. Using just a single-layer Ceramic 50 against a dyed Charcoal film demonstrated an IR rejection of 67% while dyed film achieved only 19% rejection rate.



High Definition Clarity

4 TIMES LESS VISIBILITY LIGHT REFLECTANCE (VLR) THAN METALIZED FILM.

Metalized films have reflective surfaces which inhibit their usage due to regulatory constraints in buildings and automotives. Highly reflective mirror-like surfaces affect night driving. The visible glare of metalized films are 4 times more than that of Hüper Optik Ceramic film. One unique feature of Hüper Optik multi-layer Nano-Ceramic film is its low reflectance from 380 - 750nm range, enabling maximum visible light to be transmitted.



Extreme Comfort

13°C COOLER COMPARED WITH NO FILM.

In a Temperature Test Study conducted in March 2009 on a Honda Jazz in a controlled climate chamber, it was shown that the combination of Hüper Optik Ceramic 70 and Ceramic 15 reduced the cabin temperature by almost 13°C after 120 minutes of exposure to halogen light source.



Resilience

25 TIMES MORE DURABILITY THAN CONVENTIONAL FILM.

Most dark films are made of chemical dyes that will fade when exposed to external elements. In an accelerated weathering test on Xenon Arc, after 500 hours of exposure, the dyed film faded by 117% with Visible Light Transmission reading changing from 8.6% to 18.7%. The colour migrated to a bronze tone soon after 4 days in Xenon Arc and QUV chamber, makes the film undesirable for any application. Hüper Optik Nano-Ceramic films offer 25x more durability than conventional films. All Hüper Optik products undergo the following stringent tests.