

What's The Latest In Free-Form Technology?

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Richmond, Virginia

Lots going on!

- Continued processing advancements
- FF designs continue to evolve
 - **More personalization**
 - Continued enhancements in aberration control and distortion
- Private label free-form lenses
- New electronic measuring technologies
 - POW measurements
 - Wavefront aberrations
- Electronic eyewear
- Lens Casting

Equipment Advancements for ECPs

- Smaller equipment being made
- ECPs now getting into FF surfacing onsite
 - Mostly larger businesses with multiple locations and a central lab
- Equipment companies coming out with smaller units for smaller retailers

LENS DESIGN

1. Optimized
 - The free-form design is used to overcome common optical aberrations and mechanical limitations of traditional surfacing.
 2. "Framitized"
 - The PAL designs are modified to specific fitting, frame or adjustment characteristics.
 3. Personalized
 - The PAL designs are created specifically to the prescription and individual viewing habits.
- The individual designs will all include number one. Two and/or three may or may not be included.

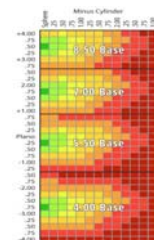
LENS DESIGN

1. Optimized Optically
 - Here, the free-form design is used to overcome optical aberrations and compromises that cannot be addressed with traditional surfacing

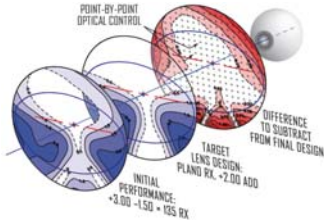
Limitations of Traditional Lenses

Optics of Semi-Finished Lenses

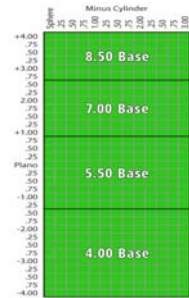
- Each lens power requires a unique Base curve in order to eliminate lens aberrations
- For semi-finished lenses to be practical, broad prescription ranges must be grouped in a few common Base curves
 - A semi-finished lens blank can only perform optimally for an "average" Rx power
 - As powers deviate from average, optical performance deteriorates



Equal and Opposite



Every prescription will perform exactly as intended.



2. "FRAMATIZED"

- These PAL designs are modified to specific fitting, frame or adjustment characteristics
 - Corridor lengthened or shortened depending upon the frame's "B" measurement
 - Reading insets can be varied based upon the power

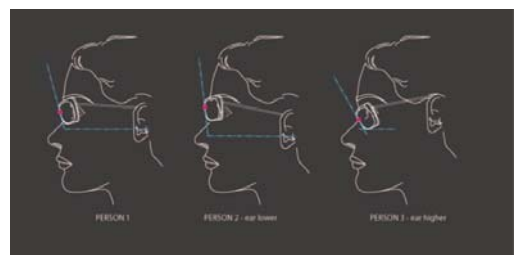
3. PERSONALIZED

- Individuals look at the world differently
 - Head movers
 - Eye movers
 - Reading distance
- Specific physical measurements
 - Measuring these tendencies allows the program to offer even a better design
 - Vertex distance
 - Frame wrap
 - Pantoscopic angle

Personalized *Vertex Distance*

- The EFFECTIVE power of a lens changes as the lens shifts toward or away from the eye
- Effect on plus and minus lenses

Personalized *Pantoscopic Tilt*



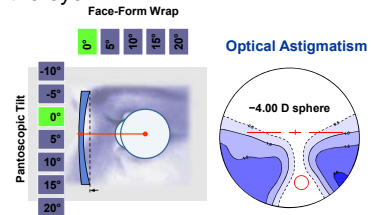
Personalized Pantoscopic Tilt

- Inaccurate panto tilt induces cylinder at the 180 meridian
 - A plus sphere will induce + cyl
 - A minus sphere will induce - cyl

Note: This induced cylinder will not show up in the lensometer

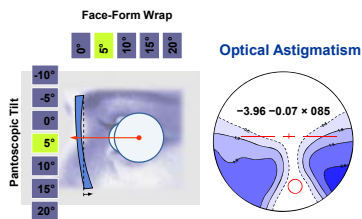
Tilt Error

- Conventional lenses are often designed to deliver ideal optimal optical performance when the lens has no tilt relative to the optics of the eye



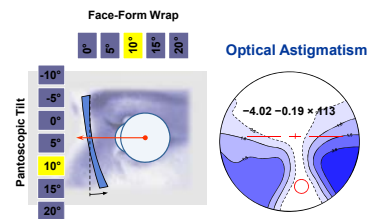
Tilt

- As the pantoscopic or face-form tilt of the lens increases, optical performance begins to deteriorate



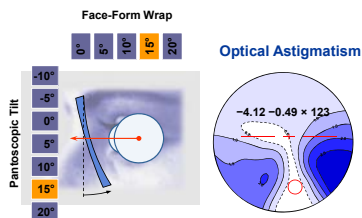
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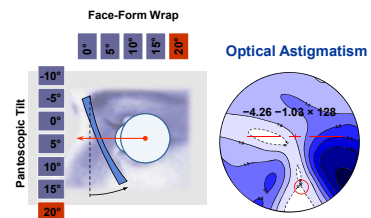
Tilt

- As the pantoscopic or face-form tilt of the lens increases, optical performance begins to deteriorate



Tilt

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An Overview of a Few FF Lenses

TotallyOptical.com

FREE-FORM PROGRESSIVE LENS AVAILABILITY													
MPPL	BRAND	1.50	1.56	1.59	1.61	1.66	1.67	1.69	1.74	1.76	1.77	1.79	1.74
ZEISS	Zeiss Individual 2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Zeiss GT2 - 3D	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Essilor	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Definity 2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Varilux Ipseo IV	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Varilux Physio Enhanced	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	S Series	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	iZon	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	iZon Progressive	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	HOYA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
iD Lifestyle	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
iD MyStyle	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	

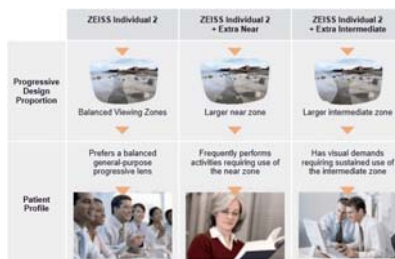
LENSES

- Carl Zeiss Vision
 - Zeiss Individual2
 - Zeiss GT2 - 3D
- Essilor
 - Definity 2
 - Varilux Ipseo IV
 - Varilux Physio Enhanced
 - S Series
- iZon
 - iZon Progressive
- HOYA
 - iD Lifestyle
 - iD MyStyle
- Seiko
 - Surmount
 - Succeed
- Shamir
 - Autograph II
 - Touch
- Signet Armorlite
 - Kodak Unique

Carl Zeiss Vision Individual

- **Optimized** optics for every prescription
- **Unlimited frame choices**
- Maximum visual acuity for any face
- Precision fabrication for every lens (**POW**)
- Uniquely etched with a personalized engraving

CZV Individual 2



HOYALux MyStyle

- Personalized using a Personal Vision Profile
 - iDenifer - Online questionnaire
 - Enter PD, heights, VD, panto and wrap
- Asked to choose five to nine activities
 - Ex. Playing music, golfing, cycling, traveling, computer use, etc.- from a list and rate them in order of importance
- PAL wearing history, brand & style worn and satisfaction with them
- iIdentifier quantifies & analyzes data & suggests a design

HOYALux MyStyle

- Three design profiles serve as jumping-off points
- To be customized through personalization
- Uses the “vertical and horizontal” designing of their iD lenses

HOYALux MyStyle

- **Clear:**
 - Extra wide deformation-free distance with a clear and free field of vision
- **Balance:**
 - For a more dynamic lifestyle, in which focused vision and stability at all angles and in all situations is crucial
- **Open:**
 - Maximizes relaxation. Instead of placing high demands on specific vision areas, the focus is on optical balance, a soft progression structure and a wide reading area.

HOYALUX iD

The First Integrated Double Surface Progressive Lens

- Perfect integration between far and near vision
- No swimming
- Wide view at all distances

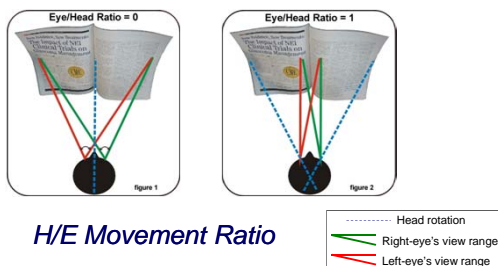


Varilux IPSEO IV

- Personalized backside design with infinite variations based upon measured wearer behavior
 - Use specialized equipment, Vision Print System, to measure the patient's visual strategy
- Progression tailored to the natural visual strategy of the wearer providing:
 - Up to 60% increase in width for “eye movers”
 - Up to 30% less swim for “head movers”

Varilux[®] Ipseo[®] H/E Ratio

Varilux Ipseo employs FreeForm to incorporate *H/E Ratio* into PAL design...



Varilux IPSEO

- Use standard PAL fitting information PLUS the following information from the Vision Print System:
 - Head/Eye movement ratio
 - Stability Coefficient
- Fitting height of 14mm, 16mm or 18mm
- Up to 4 letters may be given for personalized laser engraving

Good, Better, Best System

- Gives patients choices
- Helps maintain your profitability
 - Price lenses so that you make good margins on each level
 - Don't just use 2x or 3x mark-up
- Always start with your best and go down
 - For better, "This lens used to be our best ..."
 - For good, "This is our budget lens ..."
- Good – price it like your low priced competitors?

Good, Better, Best

	Progressive	Single Vision
BEST	Zeiss Individual PAL	Zeiss Individual SV
BETTER	Zeiss GT2 3DV	Zeiss 3D SV
GOOD	Zeiss GT2 3D / short	

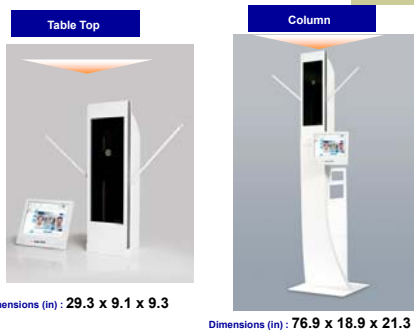
Electronic Measuring

- The wave of the future
- All dispensaries will have one
 - As common as the corneal reflex pupillometer
- Takes frame measurements
- Takes POW measurements
- High degree of accuracy
 - Better than you can do manually in most cases
- High tech image for your office
- A good companion to FF lenses

What's Available?

- ABS inc.
 - Smart Look
 - Smart Mirror
 - Smart Centration Basic
 - Smart Centration Diamond
 - Smart Centration xs
 - Tablet option
- Carl Zeiss Vision
 - i-Terminal
- HOYA
 - Spectangle (iPad app)
- EyeDispense (iPad 2 app)
- Essilor of America
 - Visioffice
- Optikam Technology, Inc.
 - Optikam
 - Tablet option
- ProFit Optix
 - SmartEyePix HD

Visioffice



Frame Selection

With its digital technology, Visioffice can photograph and film patients to help them with frame selection. The result can be printed and given to them.

- > An indispensable feature for high Rx patients.
- There's a lot of patients who would like to see what they look like in their frames*

Accurate Measurement

- **Visioffice provides highly precise results – free of the parallax effect :** < 0.5mm for distances – The nearest degree for angles
- **Real-time analysis of the head angle:**
During video shot, Visioffice identifies the most natural head posture and the most appropriate shot to deliver the parameters.

User Friendly

- **Quick measurement :** Less and 2 minutes to take all measurements including Eye Rotation Center, vertex, height, pantoscopic angle, etc.
- **Interfaces with Visionweb on line ordering or print out to fax to lab**

Optikam

- Virtual try-on up to 4 frames
- Compares lens thickness w/different materials
- Illustrates lens designs – ex. Progressives
- Demonstrates
 - Photochromic, polarized, AR, lens tint
- Print images or send them via email
- Takes POW measurements

Optikam

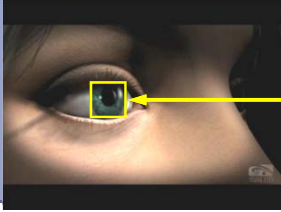
- Plays video clips for educational and promotional purposes
- Interactive - patient can work it by themselves
- Can act as a kiosk

Wavefront Design Lenses

- A revolution in spectacle lenses
 - Using "corrected curves for over 100 years
- Two types of aberrations
 - Lower
 - Higher
- Found in all lenses & optical systems
- Lower
 - Sphere, cylinder, axis
- Higher = up to 20% of your visual acuity

- Known about for many years but manufacturing technology not available
- Debuted in LASIK surgery
- Now used in spectacle lens design and manufacturing (contacts too)

The Human Eye is an Imperfect Optical System



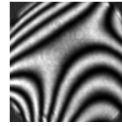
Many localized aberrations

"Optical fingerprint"

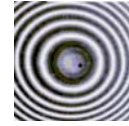
iPrint™

Today We Try To Correct an Imperfect Optical Eye With a Perfect Spectacle Lens

The Optical Fingerprint



Conventional Lenses

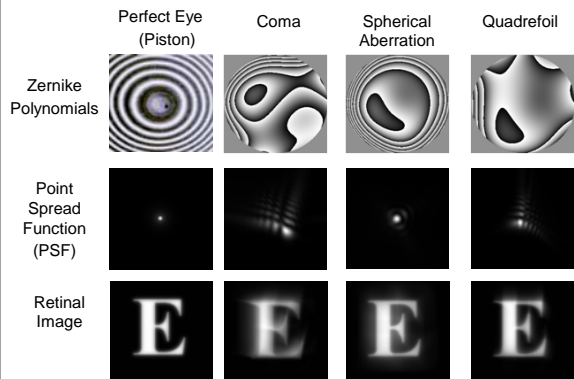


Sphere

Cylinder

Result: 20% of Refractive Error is Left Uncorrected!

Three Views of Higher Order Aberrations



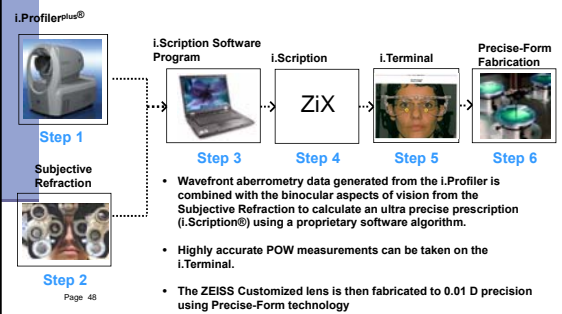
Varilux S Series

- A digital portfolio of 3 designs
 - S, S Fit, S 4D
- Use Nanoptix Technology and SynchronEyes Technology
- Nanoptix
 - Four new patents
 - Re-engineers the fundamental structure of the lens
 - Eliminates swim & increases stability

■ SynchronEyes

- Simultaneously calculates the lenses as a pair to help both eyes working together
- Better retinal image matching & improved spatial perception

i.Scription® Process



i.Scription® Software

Analysis



Simulations



- Easy to use software interface
 - Review ocular wavefront maps, magnitude of higher order aberrations
 - Simulations for a patient comparing an autorefractor correction and i.Scription correction

The Prescription

Conventional Rx (Subjective Refraction)

- 0.25D increments, 3mm pupil size

	Sphere	Cylinder	Axis	Add
OD	-7.00	-2.75	6	1.75
OS	-7.00	-1.75	1	1.75

ZIX (i.Scription)

- 0.01D increments, larger pupil size, optimized for higher order aberrations

	Sphere	Cylinder	Axis	Add
OD	-7.67	-3.12	1	1.75
OS	-7.24	-2.38	4	1.75

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ZEISS Customized lenses

i.Scription® offered only on ZEISS Customized Lenses

	Progressive	Single Vision
BEST	Zeiss Individual PAL	Zeiss Individual SV
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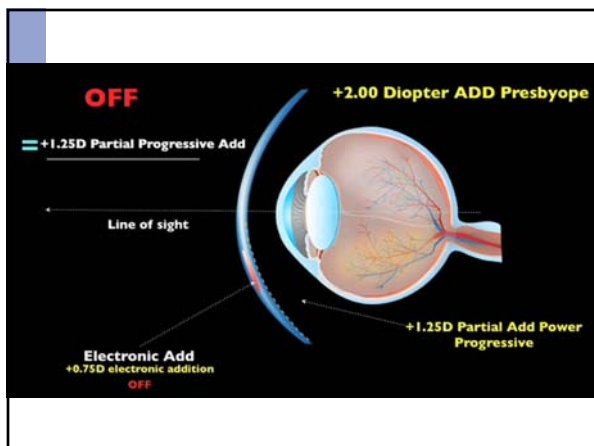
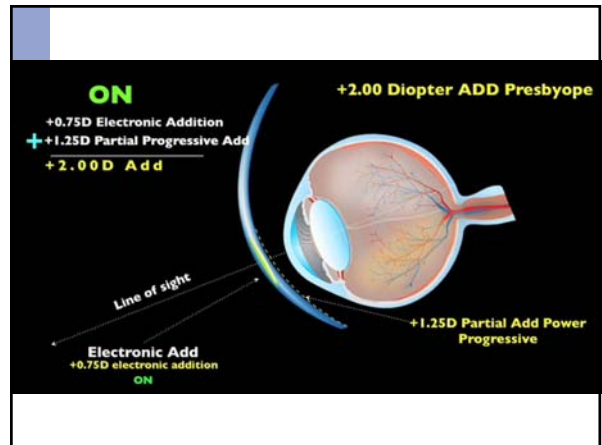
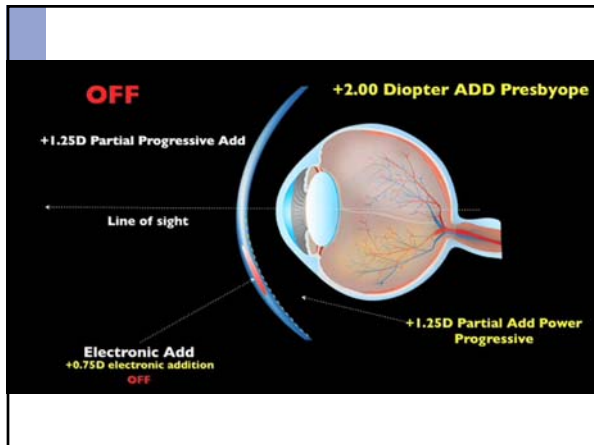
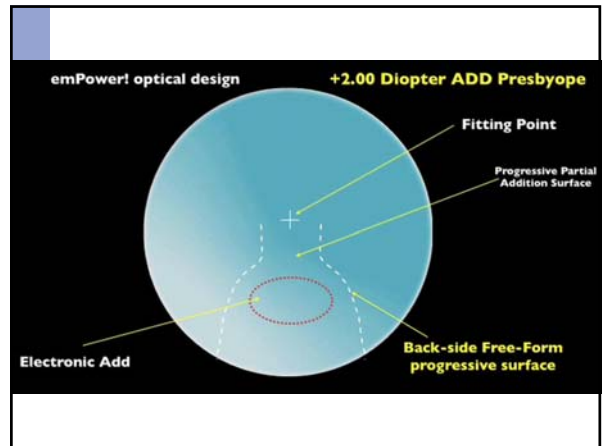
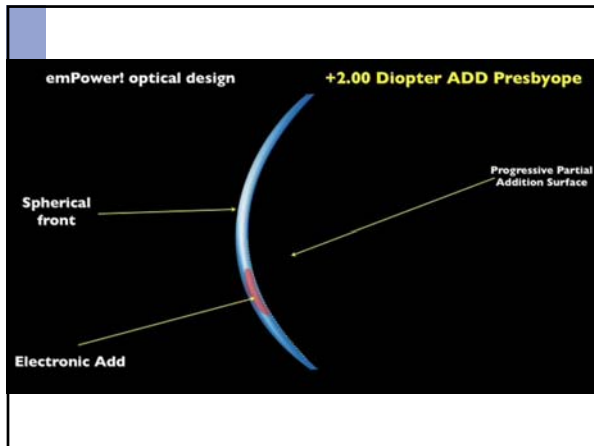
Single Vision Free-Form Lenses

- Essentially single vision version of PAL designs
- Deliver the features and benefits of the distance portion of the PAL
 - Optimized

SV Free-Form Lenses

- iZon SV
 - As mentioned earlier
- Essilor 360° sv
 - Poly, 1.67, and 1.74 (& Any Crizal coating)
- CZV Individual SV & ZEISS 3DSV
 - Optimized like their Individual PAL
- Seiko Super MV 1.67
- HOYA
 - Nulux EP (double sided FF correction)
- Optixx "upgrade" –through ProFit Optix
 - Upgrade (Many materials & treatments)

emPower!
Electronic Eyewear
Redefining the way people will see



- ### Things to Know
- Frames and lenses are wired
 - About 100 styles right now
 - Accelerometers in the temples
 - Batteries in the temples
 - Lens charge lasts about 2 days
 - Good for going up or down stairs, crossing the curb, etc.
 - Golfers, unsteady people, computer users, etc.

How Revolutionary Are These?

- First electronic eyewear
- This is surely the first step
- Already placed into IOLs
- How about completely electronic eyeglasses?

Private Label Free-Form Lenses

- Labs now creating private label free-form lenses
- Provide their own brand of FF lenses for ECPs
 - Substantial savings
 - Same advanced features
- Creating an entirely new category of products for ECPs and providing choices

Labs Producing Them

- Pech Optical - Pech Pro lenses
- Rite-Style Optical - Geo-Form PAL
- Central Optical Lab – iCentauri
- Luzerne Optical - SightStar 365 lenses
- Expert Lab - private label lenses
- US Optical - private label lenses

- VSP has their own private label FF lenses

ECPs

- Equipment is expensive for retailers
- Accurate Optical - Luminosity HD “house brand”
- 25,000 pairs of eyeglasses a year
- 50% free-form lens rate
- Offer their “house brand” free form progressive to every progressive wearer

- Some ECPs are selling 95% private label free-form lenses!

ECPs

- Some ECPs also buying FF equipment and designs
- Helping their margins substantially
- Are they as good as manufacturer’s lenses?
 - That’s up to you

Transitions Vantage

- Making the impossible possible

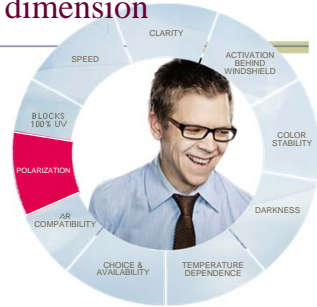
Performance factors

- To achieve desired performance dyes are blended
- Balancing all factors creates superior wearer experience



Adds another dimension

- Breaks the paradigm that clear to dark is the only variable



Four types of glare

Four types of glare managed by Transitions Vantage with AR

	Distracting Glare	Discomforting Glare	Disabling Glare	Blinding Glare
EVERYDAY EYEWEAR				
Transitions Vantage lenses with AR	✓	✓	✓	✓
Photochromic lens with AR	✓	✓	✓	
Clear lenses with AR	✓			
SUNWEAR				
Sun lenses			✓	
Polarized sun lenses			✓	✓

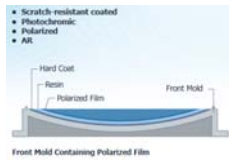
Lens Molding

- Is the way all plastic lenses are produced
- Several companies have tried it
 - Optical Dynamics
- Newest version – Qspex

Lens Molding

- In-office lens making in about 35 minutes
- Uses one-time mold sets
- All lens options are in the molds
 - Photochromic, AR, polarized, hard coat
 - Molds must be ordered with the options you want
- Molds are made using free-form technology
- “Closed” monomer system protects equipment and operator
- 1.55 index lens material

Qspex System



Thanks for
Attending!

Ed De Gennaro
Richmond, Virginia

