Transitions®

Product Information & Rx Processing Guidelines for Transitions Everyday Adaptive Lenses

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INTRODUCTION & ACKNOWLEDGEMENTS

Transitions Optical Limited,("Transitions Optical"), is the inventor of the #1 eye care professional- recommended photochromic lenses. All Transitions® lenses adapt to changing light conditions to enhance how people see the world. We are proud of our long history of continuous innovation. Transitions® everyday adaptive lens technologies Transitions® Gen S™, Transitions® XTRActive® new generation, Transitions® XTRActive® Polarized™ and Transitions® Signature™ GEN8™ are available in a wide array of materials and designs.

The following optical laboratory processing information was collected and developed for Transitions Optical. This guide covers all current Transitions lens materials: 1.50 (Standard Index, whether CR-39® or CR-607™), Trivex®, 1.56 Index, Polycarbonate, 1.60 High-Index, Tribrid™, and 1.67, 1.70, 1.74 and 1.76 Ultra High-Indices from multiple polymers. Not all materials are available in all regions. For detailed availability, please contact your Transitions Optical account manager.

These process recommendations were generated under optimum conditions by each vendor's expert technical staff. Always consult with your equipment and process consumables supply vendors for best operating conditions.

This guide would not have been possible without the contribution of time, effort and expertise put in by the following leaders in laboratory equipment and supplies to the optical industry. Please check their websites regularly for exciting new products and information.

Gerber Coburn
www.gerbercoburn.com

NGL Cleaning Technology
www.ngl-cleaning-technology.com

PPG Industries
www.ppg.com/optical/opticalproducts

Satisloh
www.satisloh.com

Schneider Optical Machines
www.schnieder-om.com

SCL International
www.scl-intl.com

SDC Technologies, Inc.
www.sdctech.com

Thank you for choosing Transitions lenses. www.transitions.com Sincerely,
The Product Development, Quality and Marketing teams of Transitions Optical

The information provided herein is presented as a convenience to laboratories and eye care professionals processing Transitions lenses. This document is not intended to be a comprehensive or exhaustive guide. Much of the information was provided by third parties. While Transitions Optical makes reasonable efforts to determine the accuracy of the information, neither Transitions Optical nor the third parties listed make any warranties or representations, express or implied, as to the accuracy, completeness or any other aspect of the information contained in this guide.

1. Transitions Optical, MSW-ARS, Global Consumer Brand Tracking, 11 countries (US, CA, FR, IT, UK, SP, GE, BR, CO, CH, IN), 2018-2020

TRANSITIONS® GEN S™ LENSES

Transitions® GEN S™ steps in as the new lens standard, going beyond the ordinary and offering a dynamic, fantastic and love-wear experience that aligns with the everchanging rhythm of life.

Transitions® GEN S™ is available in 8 exclusive colors, including a brand-new addition: Transitions® GEN S™ ruby. All colors have been optimized to be true to tone at all times, offering vibrant tints regardless of the light or environment.

Transitions® GEN S™ uses advanced symbiotic technology where the dyes and matrix are specifically designed to seamlessly interact together. The new matrix architecture strikes the right balance between soft and hard spaces, facilitating dye performance while maintaining robustness. The new super-charged dyes absorb more energy, improving the kinetics inside the matrix and providing the right balance between vivid colors and seamless responsiveness.

Transitions GEN® S™ is offered in 8 vibrant colors:

NEW **Ruby** 

Sapphire 

Amethyst 

Emerald 

Amber 

Gray 

Brown 

Graphite Green 

Product offer per color:

		Gray	Brown	Graphite Green	Sapphire	Amethyst	Amber	Emerald	Ruby
CR39		FSV / SFDS / PAL			SFSV / PAL				
Trivex		SFSV / PAL							
1.56		FSV / SFSV / PAL							
Polycarbonate		FSV / SFSV / PAL			SFSV / PAL				
1.60		FSV / SFSV / PAL			SFSV / PAL				
1.67	MR7	FSV / SFSV / PAL			SFSV / PAL				
1.74		SFSV / PAL							

TRANSITIONS® XTRACTIVE® NEW GENERATION

PRODUCT AVAILABILITY

The new Transitions XTRActive New Generation (1.5O) lens configurations are:

- ✓ FSV / SFDS / SFSV / PAL will now be available in CR39 material
- ✓ MF will remain available with CR6O7 with the XTRActive 1 technology (produced with imbibition process)

Product offer per color:

		Gray	Brown	Graphite Green	Comment
1.5O	CR39	FSV / SFDS / PAL			FSV only available in Grey / Brown
	CR6O7	MF			Remains in XTRActive 1 technology (imbibition)
Trivex		SFSV / PAL			
Polycarbonate		FSV / SFSV / PAL			
1.6O		FSV / SFSV / PAL			FSV only available in Grey / Brown
1.67	MR7	SFSV / PAL			
	MR1O	SFSV / PAL			For some lenscasters
1.74		SFSV / PAL			

Transitions® XTRActive® Polarized™ – Product Availability

		Gray
1.5O	CR39	SFDS
Trivex		SFSV / PAL
Polycarbonate		SFSV / PAL
1.6O		SFSV / PAL
1.67	MR7	SFSV / PAL
	MR1O	SFSV / PAL

SURFACING TRANSITIONS® LENSES

GUIDELINES FROM COBURN TECHNOLOGIES INC.

Blocking

- ✓ For all materials use standard Coburn blocking methods

(Note: Tribrid™ processes similar to 1.60 index material, 1.56 processes similar to 1.50 index material and 1.74 processes similar to 1.67 index material. Contact your supplier for more details).

Wait times before generating are 20 minutes for wax and 1 hour for alloy blocking material.

Generating

- ✓ All materials use default parameter setting with SL2, XRT, SGXPlus and DTL generators

Fining

- ✓ Standard index: 15 micron pad at 18 PSI for 1.5 minutes (not full-stop)
- ✓ Other cylinder machines: bar pressure 2.5 bars for 1.5 minutes (not full-stop)
- ✓ Trivex® and Trilogy®: P800 pad same pressure for 2 minutes
- ✓ Polycarbonate: P800 pad same pressure for 2 minutes
- ✓ 1.60 and Tribrid™: 15 micron pad same pressure for 1.5 minutes
- ✓ 1.67: 15 micron pad same pressure for 1.5 minutes

Polishing

- ✓ Gerber Coburn Satinal® 774 polish
- ✓ Supreme pink polishing pad for all lens materials
- ✓ Polycarbonate and Trivex® and Trilogy® : 6 minutes at 18 PSI or 0.4 bars
- ✓ Standard index, Tribrid™ and high-indices: 4 minutes at 18 PSI or 0.4 bars
- ✓ Cut To Polish (CTP) Option: Use Gerber Coburn's standard processing parameters for all materials.

SURFACING TRANSITIONS® LENSES

GUIDELINES FROM SATISLOH

Recommended processing guidelines

Blocking & Generating

Satisloh recommends the following procedures for processing all materials.

(Note: Tribrid™ processes similar to 1.60 material, 1.56 processes similar to 1.50 index material and 1.74 processes similar to 1.67 index material. Contact your supplier for more details)

- ✓ Blocking: Satisloh Auto blocker, Manual PRA, and ART Blocker (Alloy Free)
- ✓ Surface tape-Satisloh Auto Tape XL, no tape required for ART
- ✓ Alloy: 117 degrees low melt alloy
- ✓ ART version minimum Alpha V.3.04.0 with Photo Default macros
- ✓ Cool Down: Alloy- 35 to 40 minutes- ART-not necessary

Generating

- ✓ VFT Macro (manual) & Orbit 2 – For both Conventional & Individual Surfaces.
- ✓ Standard macros settings apply For 1.5 on Orbit 2
- ✓ Satisloh Macro
- ✓ Peak height [µm]- 0.04
- ✓ Workpiece rpm factor [%]-100
- ✓ Workpiece max rpm [1/min]-2500
- ✓ Satisloh LH 405 @ 3% mixture rate
- ✓ Coolant and Axis temperatures at least 20-22°C (should match room temperature of the processing environment)
- ✓ Coolant supply should be filtered 200 micron Filter

Polishing

- ✓ Polishing process on the ToroFlex -manual or MultiFlex -auto. (other Soft tool Polishers only by request)
- ✓ Standard Satisloh macro settings apply
- ✓ PolyProAllFormat slurry at a temperature of app. 60° Fahrenheit

Cleaning

- ✓ Lenses should be de-blocked by drop force method and/or with use of auto de-blocking system.
- ✓ Lenses should be washed and rinsed in manual method and/or ultrasonic cleaning system.
- ✓ ART Deblocker A (manual or automatic) for lenses blocked alloy free

SURFACING TRANSITIONS® LENSES

GUIDELINES FROM SCHNEIDER OPTICAL MACHINES

Recommended processing guidelines

Schneider Optical Machines recommends the following procedures for processing all materials.
(Note: Tribrid™ processes similar to 1.60 materials, 1.56 processes similar to 1.50 index material and 1.74 processes similar to 1.67 index materials. Contact your supplier for more details)

Surface preparation

- ✓ Surface protection tapes: tape rated for alloy blocking

Blocking

- ✓ Blocking: Schneider CB Bond
- ✓ Alloy: 117 degree low melt alloy
- ✓ Cool down time: 30 to 45 minutes

Generating (conventional and freeform)

- ✓ All Schneider high speed cutting generators
- ✓ Standard Schneider processing macro's which are material dependent
- ✓ Synthcut O5 coolant additive at a 3% - 5% percent ratio
- ✓ Coolant temperature within 3°C of ambient temperature
- ✓ Swarf removal system should be filtered to remove cutting particulate

Polishing (conventional and freeform)

- ✓ All Schneider computer controlled polishers
- ✓ Standard Schneider processing macro's which are material dependent
- ✓ Schneider Perma polishing pads
- ✓ Schneider Alumunox polish

Post surfacing preparation

- ✓ Lenses are de-blocked using shock blocks
- ✓ Lenses should be washed and dried as usual

PROGRESSIVE INK STAMP REMOVAL

FROM TRANSITIONS® LENSES

Where requested, Transitions Optical applies a marking stamp for progressive lenses. The following process can be used to remove this ink prior to hard coating:

✓ Guidelines from NGL Cleaning Technology SA

	Ultrasonics					
Process	Optical 2010 + CEROWEG 2018 Additive	Tap water rince	Tap water rince	Tap water rince	DI water rince	Drying
Concentration	10% + 10%		10%			
Temperature	60C	25C	50C	30C	40C	
Time	5 min	3 min	3 min	3 min	3 min	5 min

APPLICATION OF HARD COAT LACQUERS

Also known as hard coats or hard coatings – general guidelines

Hard coating

Transitions Optical offers products in both hard coated and uncoated configurations.

In some markets it is common for labs to purchase Transitions® lenses without factory hard coat – then to dip coat the hard coat after surfacing. In other markets it is common for labs to purchase Transitions lenses with a factory hard coat – then spin coat a hard coat on the back after surfacing. In the following sections both dip and spin configurations are given – please use the one appropriate for your lab. In either case, a hard coat should be applied to further protect the lenses.

Transitions do not recommend any further tinting of the lens as this may adversely affect its performance characteristics, including but not limited to the photochromic performance and color/hue. Those performing any subsequent tinting remain responsible for ensuring the product conforms to regulatory requirements.

Where uncoated lenses are purchased from the lens manufacturer, the lenses need to be etched prior to hard coating.

Lens etching

	Dip Coating (both sides)
Medium	2.4 N KOH
Temperature	55-60°C
Time	4-6 minutes

To achieve good adhesion of the hard coat to lenses from our Trans-Bonding™ process, (e.g. not CR-607™,) it will sometimes be necessary to use a 'dry-etch', e.g. corona or plasma activation, prior to the caustic chemical etch. This depends on the hard coat being used – and the dry etch process would need to be validated.

If both dry etch and chemical etch (table above) are still not sufficient to gain proper adhesion, a primer could be used – contact your hard coat supplier for recommendations.

Following etching, it is vital to ensure that the lenses are completely clean and free from any caustic or detergent residue. Lenses must be rinsed using RO and DI water and dried "spot free".

Hard coating curing

In order not to adversely impact lens properties, suggested curing conditions are as follows:

	Thermal Cure	IR Cure
	PRE-CURE	
Temperature	65-75°C	65-75°C
Time	16-24 minutes	40-60 seconds
POST-CURE		
Temperature	95-105°C	
Time	3 hours	

The listed times and temperatures are suggestions based on the experience of Transitions Optical with different hard coats. Higher temperatures and shorter curing times may be possible. However, please ensure there are no negative effects on either the performance of the hard coat or on possible subsequently applied AR coating stack.

It is also recommended that a controlled ramp up and ramp down temperature profile be incorporated into the post-cure cycle to prevent negative effects either on the performance of the hard coat or on possible subsequently applied AR coating stack.

Hard coating stripping

If there is a need to remove the factory supplied hard coat from Transtions SF lenses, the following striping conditions are suggested

Medium	2.4 N KOH
Temperature	50 - 60 C
Time	
Post-cured hard coat	8 - 10 minutes

The post-cured stripping time is based on the Transitions Optical applied Hi-Gard® 1080. (Please refer to coating supplier for recommended times for specific hard coats).

APPLICATION OF HARD COAT LACQUERS

GUIDELINES FROM SCL INTERNATIONAL

Lenses	Tanks						IR1	COOL	PRIMER	IR2	COOL	VARNISH 1	VARNISH 2	IR3
	1	2	3	4	5	6								
1.50	✓	✓	✓	✓	✓	✓	✓	✓				✓		✓
1.60 1.67	✓or ✓✓	✓	✓	✓	✓	✓	✓	✓					✓	✓
Poly	✓or ✓✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

Legend	
4 mins	✓
8 mins	✓✓

Polymerization

Lens	Polymerization
1.5	2h30 @ 110°C or 3h15 @ 100°C
High Index	4hrs @ 110°C or 4h30 @ 100°C
Polycarbonate	2h30 @ 110°C or 3h15 @ 100°C

Hardcoat process

Tank 1	8% LC-OH @ 55°C
Tank 2	4% LC-OH + 2.5% LC-40 @ 50°C
Tank 3	Tap water 15°C
Tank 4	2.5% LC-01 @ 50°C
Tank 5	Tap water @ 15°C
Tank 6	Di water @ 38°C
IR1	80°C in the air
PRIMER	110-03-PR @ 11°C (0.5 – 0.7 µm)
IR2	80-85°C on the lens
VARNISH 1	152-72-NT @ 11°C (2.5 – 4 µm)
VARNISH 2	160-03-NT @ 20°C (2.5 – 4 µm)
IR3	80°C on the lens

APPLICATION OF HARD COAT LACQUERS

GUIDELINES FROM SDC TECHNOLOGIES

Cleaning & etching

TANK NO	CONTENTS	TIME (S)	TEMP (°C)
1	Ultrasonic etch – 50% v/v OP 141 (a)	600	60
2	Rinse – City water	300	Ambient
3	Ultrasonic rinse – 3% v/v OP 171 (b)	300	50
4	Rinse – City water	300	Ambient
5	Ultrasonic rinse – DI water	300	50
6	DI water rinse with slow fit	300	50
7	IR dry (temperature is nominal)	300	50
8	Air dry	300	Ambient

(a) OP-141 available from Borer Chemie (see:http://www.borer.ch/en/products/borer-industry/)
(b) OP-171 available from Borer Chemie (see:http://www.borer.ch/en/products/borer-industry/)

1.50 Index / Mid Index / Trivex – Use TC-3000 under the following conditions (more details available from local SDC Representative):

PARAMETER	NEEDS
Withdraw Speed	1.5 - 2.5 mm/s
Film Thickness Range	2.0 – 3.5 µm
Air Dry	4 mins
IR Dry (170-180°C, ceramic temp, nominal)	4 – 5 mins
*Cure	2hrs @ 110°C

*Cure/Polymerisation
Due to temperature sensitivity of some polymer lenses, the post cure temperature may be adjusted. This may lead to some compromise in coating performance. Please refer to local SDC representative for details.

Polycarbonate – Use PR-865 Primer with TC-3000 under the following conditions (more details available from local SDC Representative):

PARAMETER	NEEDS	
	PR-865	TC-3000
Withdraw Speed	0.9 – 1.7 mm/s	1.5 - 2.5 mm/s
Film Thickness Range	0.5 – 1.0 µm	2.0 – 3.5 µm
Air Dry	4 mins	4 mins
IR dry (170-180°C, ceramic temp, nominal)	4 mins	4- 5 mins
*Cure		3hrs @ 129°C

*Cure/Polymerisation
Due to temperature sensitivity of some polymer lenses, the post cure temperature may be adjusted. This may lead to some compromise in coating performance. Please refer to local SDC representative for details.

Hi Index - use CC-1602 or alternatively IM-9060*

PARAMETER	NEEDS	
	CC-1602	IM-9060*
Withdraw Speed	1.4 - 2.6 mm/s	2.5 mm/s
Film Thickness Range	2 – 3 µm	2.5 – 3.5 µm
Air Dry	4 mins	4 mins
IR dry (170-180°C, ceramic temp, nominal)	5 - 10 mins	10 mins
*Cure	3hrs @ 120°C	3hrs @ 120°C

*IM-9060 can only be used with factory hard-coated Transitions lenses after stripping. Adhesion issues have been seen when coating non-factory hard-coated Transitions lenses.

APPLICATION OF HARD COAT LACQUERS

GUIDELINES FROM SATISLOH

Machine / hard coat recommendations

Magna spin, satisloh solvent manual (off/on block) – Auto on block

- ✓ RECOMMENDED FOR AR coatings applications (up to KX_Satin)
- ✓ MS-U9OO Non-tintable for CR39, MR8 1.6O, MR71.67, MR1O 1.67, Polycarbonate, Hard Coated Blanks

MS U9OO SAP 92-OO8-344
G SERIES: G3 & G4, SATISLOH all solids chemistry machines

- ✓ Recommended for general purpose lab use
- ✓ G Series coatings are as follows:

  G-T1OO Tintable all materials coating

  G-NT1OO Non-tintable all materials coating

SL DC S, SATISLOH DIP Hard Coating

- ✓ Recommended for AR coatings applications (up to KX_Satin)
- ✓ SL DT15OO for CR39, MR8 1.6O, MR71.67, MR1O 1.67 (1) Uncoated Blanks
- ✓ SL DP1OO + SL-DT15OO (Primer+Hard Coat) for Polycarbonate, MR 1.74
- ✓ DT15OO SAP 92-OO7-8O1
- ✓ DP1OO SAP 92-OO7-O92

MR3 (largest) and mini-2, ultra optics coating machine

- ✓ Ultra Optics coatings are as follows:

  UV-NV Tintable all materials coating

  UV2OO Tintable all materials coating

APPLICATION OF HI-GARD® HARD COATING

GUIDELINES FROM PPG INDUSTRIES

Hi-Gard® HC non-tintable coating solutions are designed to be used on ophthalmic lenses made from plastic materials. Before coating lenses, the coating solution should be filtered through a 0.45 µm (micron) filter such as a polypropylene capsule filter. The coating can be applied by standard techniques for room temperature dip and spin coating. For dip coating, draw speed can be adjusted to achieve desired coating thickness in accordance with environmental factors, such as temperature and humidity.

Recommended environmental guidelines

- ✓ Coating Solution temperature at application: 15-20°C
- ✓ Air temperature at application: 20-25°C
- ✓ Relative Humidity: 30-50%
- ✓ Coating Solution Temperature: Overnight 0-10°C

DIP COAT GUIDELINES

Cleaning, etching & coating

Step	Process	Time (SEC)	Temperature (°C)
1	Ultrasonic Etch: 10% - 12.5% NaOH	300	50 – 60
2	Rinse – RO Water	300	Ambient
3	Rinse – RO Water	300	Ambient
4	Rinse – DI Water	300	25 - 50
5	Air Dry	300	70 – 75
6	Cooldown	300	Ambient
7	Coating: Soak	10 – 15	15 – 20
8	Coating: Draw	6"/min (150 mm/min) to achieve a film thickness of 3-5 microns	15 – 20
9	Air Dry	300	Ambient
10	Pre-Cure	300 – 600	60 – 70

Polymerization/Postcure 3hrs at 120°c

Due to temperature limitations of some plastics, the post cure temperature can be adjusted lower, but some compromise in scratch resistance and coating porosity will result. Lower post cure temperatures will result in lower scratch resistance and greater porosity of the cured film which may result in greater permeability of tints, dyes, and inks (ghosting).

SPIN COAT GUIDELINES

Cleaning, Etching & Coating

STEP	PROCESS	TIME (SEC)	TEMPERATURE (°C)
1	Ultrasonic Etch: 10% - 12.5% NaOH	300	50 – 60
2	Rinse – RO Water	300	Ambient
3	Rinse – RO Water	300	Ambient
4	Rinse – DI Water	300	25 - 50
5	Air Dry	300	70 – 75
6	Cooldown	300	Ambient
7	Coating: Spin Application	3 – 5 g of coating solution at a rate of 1g/sec	15 – 20
8	Coating: Spin Out	13 sec at 1100 RPM to achieve a film thickness of	15 – 20
9	Air Dry	300	Ambient
10	Pre-Cure	300 – 600	60 – 70

Polymerization/Postcure 3hrs at 120°c

Due to temperature limitations of some plastics, the post cure temperature can be adjusted lower, but some compromise in scratch resistance and coating porosity will result. Lower post cure temperatures will result in lower scratch resistance and greater porosity of the cured film which may result in greater permeability of tints, dyes, and inks (ghosting).

RECOMMENDED COATINGS

LENS TYPE/REFRACTIVE INDEX	HARD COATING	PRIMER
1.5	Hi-Gard® HC 1080S	Hi-Gard® HP 1500 (Not Required)
Trivex®	Hi-Gard® HC 1080S	Hi-Gard® HP 1500 (Not Required)
1.56	Hi-Gard® HC 1600 or Hi-Gard® HC 1600MT2	Hi-Gard® HP 1600 (Not Required)
Polycarbonate	Hi-Gard® HC 1080S or Hi-Gard® HC 1600 or Hi-Gard® HC 1600MT2	Hi-Gard® HP 1500 or Hi-Gard® HP 1600 (Not Required)
High-Index and Ultra High-Index	Hi-Gard® HC 1600 or Hi-Gard® HC 1600MT2	Hi-Gard® HP 1600 (Not Required)

Further information is available from PPG – please contact your local PPG Representative

APPLICATION OF ANTI-REFELECTIVE COATINGS

GENERAL GUIDELINES

Always consult with your equipment vendors for best operating conditions.

Cleaning procedures and surface preparation guidelines prior to anti-reflective (AR) coating

Note that Transitions Optical does not recommend specific cleaning or lens preparation processes as these may vary depending on the hard coat and equipment used.

However, in general, the lens surface should be thoroughly cleaned and free from any contamination and/or detergents prior to the AR coating process.

Ultrasonic washing is recommended. The bath temperatures should be approximately 50°C to 55°C. Check with your equipment suppliers for any further recommendations.

If a detergent with high pH (>10) is used, care should be taken to verify that the hard coat is resistant to the detergent and that no damage occurs to the surface. Any damage to the hard coat will affect the durability of the AR coating.

If the hard coat is more sensitive to alkaline detergents, avoid the use of these detergents by either replacing with a neutral detergent or omitting that bath in the wash process.

The detergent should be thoroughly rinsed from the lenses.

Recommended air drying temperature for Transitions® lenses is 55°C to 60°C maximum.

If the lenses are to be degassed or baked, it is again recommended to use a maximum temperature of 60°C. Lower temperatures for longer time periods, e.g. 4 hours, will lead to less thermal stress build up in the lens. This will decrease the probability of crazing and cracking associated with the build up of internal stresses. However, degassing overnight is not recommended.

Stresses may build up while lenses are being coated. To reduce the probability of any stress, ensure that the clips on the lenses are not too tight.

Key message

Any contamination present on any lens surface prior to AR coating may result in delamination of the coating at a later stage. This will be particularly true if the lenses are subjected to any means of stress during their life. Lenses must be thoroughly cleaned and free from any contamination prior to application of the AR coating. Contamination may arise from prior processes, dirty detergents, dirty ovens and dirty vacuum chambers or from the general environment.

APPLICATION OF ANTI-REFELECTIVE COATINGS

GENERAL GUIDELINES

AR processing guidelines

Temperature control during evaporation is essential to achieve a high quality and durable coating. The temperature should be stable.

Fine tuning of the machine may be required to achieve stable temperature during the process.

Temperature will affect the process and the final adhesion. If the temperature is lowered too much, an adhesion loss may occur.

Your equipment supplier will help optimize processing temperatures.

The temperature of the degassing oven must also be stable.
Excessive oven temperature during degassing may be a cause of stress in the lens that will later develop into cracks and/or crazing.

Machine cleanliness is very important to achieve a high quality coating.
Ensure both the degassing oven and the vacuum chamber are well maintained and clean.

The hard coat should not be so rigid that the AR coating will not bond to it and not so soft that it will be permeable.
Select a hard coat that has been qualified for the subsequent application of the AR coating.

Over curing of the hard coat can produce a rigid hard coat.
This can be a cause of hairline cracks in the hard coat that can penetrate into the AR coating stack.

Over curing of the hard coat can produce a rigid hard coat.
This can be a cause of hairline cracks in the hard coat that can penetrate into the AR coating stack.

Mechanical stress on the lens may be the cause of cracks and/or crazing if too great a force is applied to the lens during processing. Minimizing the force applied to the lens can reduce mechanical stress. It is recommended to use ring holders that will have enough "play" for lens expansion during processing.

APPLICATION OF AR COATING

Process recommendations

- ✓ Ioncote KX (No Kappa Plus)
- ✓ Performance X, MQ-X

Surface preparation

- ✓ Surface preparation prior to HC -> OP141, OP171 as per given HC PPDS
- ✓ Surface cleaning prior to AR -> Standard SL Cleaning (OP171) as per given PPDS

Curing / Degassing

- ✓ Curing after HC (DT15OO) -> 2 hours @ 11O°C
- ✓ UV Curing for MS U9OO
- ✓ Degassing prior to AR -> 4 hours +/- 1 hour (see given PPDS) @ 6O-75°C (see given PPDS)

Special conditions

- ✓ SL KAPPA Plus not recommended for Transitions Signature products. DT15OO-KX_Satin is the process dedicated for this kind of substrate.

CONSIDERATIONS FOR TINTING AND MIRROR COATINGS

Transitions Optical do not recommend any unauthorized tinting, mirror coating or any other further processing of any Transitions lens which may impact its color or hue. Such unauthorized further processing may adversely affect its performance characteristics, including but not limited to the photochromic performance, adherence to quality standards and compliance with applicable regulations. Those performing any unauthorized further processing are responsible for ensuring the product conforms to all regulatory requirements and MUST ensure that subsequent users have been informed that the lens has been further processed in a manner that was not authorized by Transitions Optical and does not meet the product claims and specifications established by Transitions Optical and therefore is no longer a Transitions branded lens.

SURFACING TRANSITIONS® LENSES

GENERAL BEST PRACTICES

Always consult with your equipment vendors for best operating conditions.
A number of processes have been identified as contributors to the "crazing" of thin lenses with AR coating stacks.

Blocking

- ✓ Various block types may be used, but blocks should be checked for conformity to the front surface, proper diameter and shape along with the wear status.
- ✓ Blue chips or taping of the front surface will protect the lens from block/chuck induced scratches and promotes blocking pad adhesion.
- ✓ Blocking pads will provide good adhesion to avoid axis twist in the edger.

Clamping pressure

- ✓ If the edger is so equipped, select the "Fragile" setting which reduces clamping pressure and feed rate.
- ✓ Excessive chucking pressure causes crazing within the lens which appears as a tight circle at the chucking point.
- ✓ Mismatched chuck/block diameters will result in unnecessary stress and flex on the lens when it is clamped.
- ✓ Mismatched chuck/block diameters can result in a bulls-eye crazing pattern on the lens.

Cutting

- ✓ Improper feed rates and worn cutting surfaces can create crazing away from the center of the lens.

Sizing and tightening

Oversized lenses will "buckle" within the frame, causing constant stress on the lens surface. Overtightening lenses in the frame might also cause constant stress on the lens surface. This effect may increase when the lenses are exposed to hot and cold extremes. Proper sizing and tightening may be verified with a polariscope to ensure no mechanical stress is present in the mounted lenses.

De-blocking

- ✓ The key to successful de-blocking is to avoid lens flex during the process. This is achieved by twisting, NOT PULLING the block off the lens surface.
- ✓ Flex during de-blocking can create a vertically oriented crazing (this pattern can also appear on lenses edged at an excessive feed rate).

SURFACING TRANSITIONS® LENSES

GENERAL BEST PRACTICES

Alignment

- ✓ Axis alignment pliers should never be used on thin lenses with AR coating stacks.

The following processing information was collected and developed by Transitions Optical and our laboratory partners in preparation for the Transitions XTRActive Polarized launch. Please note that you may encounter two different types of engraving marks while working with Transitions XTRActive Polarized lenses: markings with "+" or "T." Lenses with both the "+" and the "T" deliver the same performance – there is no difference between the two products with the exception of the alignment markings.

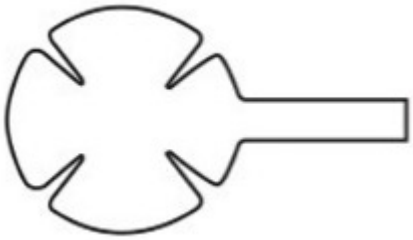
PACKAGING GUIDELINES AND PROCESSING NOTES

Note: Finished Single Vision (FSV) and Uncut Rx Lenses are known throughout the industry to be susceptible to memory impressions.

Memory impressions can be visible once the finished lens is removed from its packaging. They are caused when the packaging is pushed into the lens surface by external pressure being applied to the lens packaging (finished lens envelopes) and held there over time. This effect is aggravated by too many envelopes being packed into the dropsy cartons or by the use of rubber bands to hold multiple envelopes together. **Therefore, the use of rubber bands is not recommended.** Other variables that can affect the formation of memory impressions include storage temperature and time stored in envelopes; higher plus Finished Single Vision (FSV) and Uncut Rx Lenses are more prone to memory impressions.

Memory impressions usually disappear within hours once the lens is removed from the envelope. The harder the envelope is pressed against the lens, the longer it will take for the impression to disappear. Relaxation of impressions can be accelerated by placing the lens in an oven for 1 hour at 50°C.

To protect the front of **Finished Single Vision (FSV) Lenses** a specific envelope with extra protection is used in the shipping process, such as the foam-lined envelope. This replaced the Daisy (see picture below) sticker which has been used in the past.



Please note that there are some additional requirements for Transitions XTRActive Polarized Rx lenses, refer to the next section.

Shelf-life

The maximum storage duration is 3 years for organic lenses, from the manufacturing date until the delivery to the end customer.

The reference date for the storage (age) calculation is the production date.

Visible Side Activation

Side activation is a darker activated ring around the periphery of their Transitions lenses, it is not a defect in the lens or mishandling during surfacing and should not be a cause for alarm.

The activated ring is caused by light rays entering through the thicker, polished edges of certain prescriptions and it is only visible under certain conditions, typically low light activation. It will not be visible to the wearer or to someone observing the wearer.

A simple way of confirming side activation is by activating the lens when tape has been placed around the edge of the lens – side activation cannot occur as the tape is blocking the light from entering through the side of the lens and there will be no appearance of the ring.

TRANSITIONS® XTRACTIVE® POLARIZED™ LENSES

SURFACING, EDGING AND PACKAGING GUIDELINES

Transitions Xtractive Polarized lenses with "T" alignment markings

The polarization axis is denoted by the ">" and "<" at the edge of the lenses and the two "T" marks located 20 mm off the center axis of the lens (see Figure 1). The lens will be stamped to identify the horizontal (polarization) axis. The ">" and "<" markings are expected to be removed during the edging process. The "T" marks are permanent markings that will most likely remain on the lenses.

To view the "T" marks, rotate the polarization axis into a vertical position (see Figure 2). Use typical methods for viewing progressive mold engravings to locate "T" markings. Once located, the "T" alignment marks can be identified by placing a dot with a pen over their location. When the lens is rotated back to the vertical position, the pen marks can aid in aligning the polarization axis during the dispensing process.

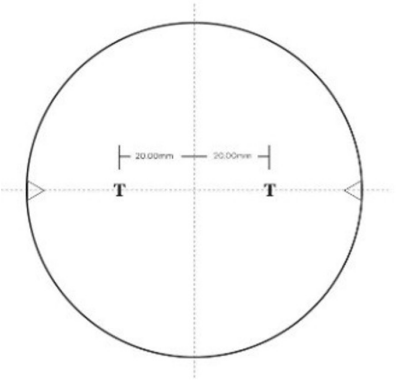


FIGURE 1

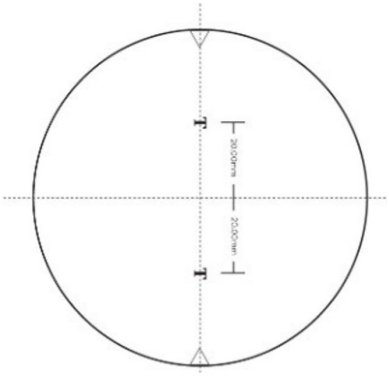


FIGURE 2

General guidelines to use in surface blocking the lenses to ensure proper alignment of the Transitions XTRActive Polarized lenses:

1. Place the lens on the blocker with the ">," "<" and "T" markings on the horizontal axis.
2. Block the lens on the optical center.
   If this is not possible due to required decentration, please be aware that the alignment "T"s may migrate to the optical center.
3. Ensure that the markings are exactly on the 0° – 180° line with appropriate or tight tolerance.

TRANSITIONS® XTRACTIVE® POLARIZED™ LENSES

SURFACING, EDGING AND PACKAGING GUIDELINES

General guidelines to use in finish blocking the lenses to ensure proper alignment of the Transitions XTRActive Polarized lenses:

1 One or more of the ">," "<" and "T" markings on the horizontal axis may be cut off during surfacing.

2 For full backside products, use the engraved micro circles for alignment.
DO NOT use a combination of engraved micro circles and the ">," "<" and "T" markings on the horizontal axis.

3 For full backside products, use the remaining ">," "<" and "T" markings on the horizontal axis. If all of the ">," "<" and "T" markings are missing from one side of the lens, spot the lens in a lensometer and use lensometer dots for alignment. Another option is to activate the lens and cross-polarize them with a piece of polarized film.

For eyecare professionals finishing an uncut lens in-office:

If you finish lenses at your office, surfaced uncuts of Transitions XTRActive Polarized lenses will need to be processed carefully. Prior to edging, verify that the polarization axis and cylinder axis are aligned.

To ensure that Transitions XTRActive Polarized lenses have been mounted in the frame correctly, please follow the procedure below:

1 Hold the lenses up to a light, looking through them to find a "T" engraving marking on the nasal and temporal sides of the lenses. Dot the crosses with a marking pen. These lines should fall on a horizontal plane of a lens aligner.

2 In the event the markings are removed, you can determine the alignment of the lenses by cross-polarizing them with a piece a polarized film.

a. Activate the lenses in the Transitions® lens UV demo lamp.

b. Hold the polarized film with the sticker facing you in the upper right hand side over the activated Transitions XTRActive Polarized lenses.

c. Rotate the film 90 degrees so that the sticker facing you is in the lower right hand side. The lenses will look their darkest when the sticker is in the lower right hand corner.

PLEASE NOTE: Transitions XTRActive Polarized lenses are not polarized in their indoor state.

TRANSITIONS® XTRACTIVE® POLARIZED™ LENSES

XTRACTIVE POLARIZED
Surfacing process recommendation

Transitions XTRActive Polarized is the most technologically advanced product ever developed by Transitions Optical. The lenses use a breakthrough, exclusive, multi-layer matrix which hosts new Transitions XTRActive broad-spectrum dyes for more darkness and new ultra-fast dichroic dyes that are especially tuned to high-glare light and when activated have the unique ability to organize into a pattern on the lens itself for polarization.

Latest technology on Rx platforms has advanced considerably over the last number of years, moving in many cases to developments in how lenses are blocked and the use of high pressure water jets for deblocking and / or detaping of lenses after surfacing. When these high pressure water jet systems are combined with lenses which have very thin edges there is a risk of coating peeling on the edge of Transitions XTRActive Polarized product. Generally this defect can be 3mm or less from the edge.
The risk associated with this phenomenon is directly related to the edge thickness of the lens after surfacing - the risk decreases as the edge thickness increases.

All testing indicates that, from the perspective of Rx processes, the Transitions XTRActive Polarized performances are aligned with that of Transitions Vantage so if you have been successfully processing Transitions Vantage there is no additional risk with Transitions XTRActive Polarized.

There is no evidence to suggest that there is any risk during any of the subsequent Rx processes including edging & mounting.

Recommendation: If producing Transitions XTRActive Polarized with very thin edges the optimal lens blocking process is Alloy process with manual deblocking.

Packaging for XTRActive Polarized

In order to ensure optimum performance of this product (as it boasts an advanced coating stack/technology) relative to other Transitions products (including Transitions Signature GEN 8 & Transitions XTRActive) it is important to take care with the packaging of the product.

The ideal flow is a full end to end flow in one site. If that is not possible, some guidelines must be considered on how to package & ship Uncut / Edged lenses.

UnCut or Edged Rx Lenses

With Transitions XTRActive Polarized there is a requirement that foam cushioning is used to protect UnCut or Edged Rx lenses if they are being shipped before mounting in frames. The following foam material is recommended:

Material: Low Density Polyethylene (LDPE) with 0% Antistatic Migrating Agent
Contamination: No dust, no stain, clean grade
Color: white Antistatic-free grade
Thickness: 1mm

TRANSITIONS® XTRACTIVE® POLARIZED™ LENSES

Edged & mounted jobs

Following cleaning & inspection, the lenses for edged & mounted jobs should be wrapped in foam (specification as above). Following this, the job should be placed in a protective case, this may take the form of a cardboard case or a more conventional spectacle case.



After Packaging of the Lens

Regardless of UnCut / Edged / Edged & Mounted jobs, the shipping of the lenses must be done in a careful manner. Rubber bands should not be used and lenses should not be packaged tightly in boxed as this can induce memory impressions.

Transitions®