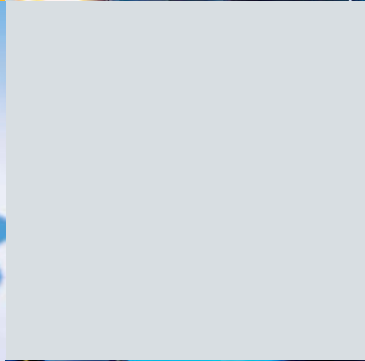


Coating Process Guide

Choose the options and performance you want.



Achieve the AR coating quality and costs that make sense for your lab. Hard coating options combined with a portfolio of AR coating stack designs and top coating options.

satisloh

Achieve quality AR – this will help you navigate the options to achieve the highest level AR performance while considering the various cost, process complexity, and capital requirement options.



Coating Process Guide

Choose the options and performance you want.

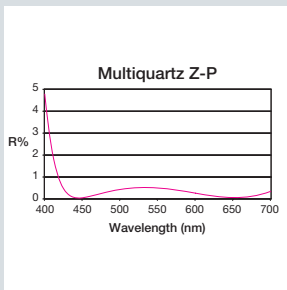
More than ten years ago AR coating was regarded as a separate performance of an ophthalmic lens.

In the meantime labs and lens manufacturers realized that ophthalmic lens performance can only be seen as a complete solution. The product performance depends on hard coating, AR coating and top coating.

Only the optimal combination of all three of them, well tuned to the individual lens material, achieves highest customer satisfaction.



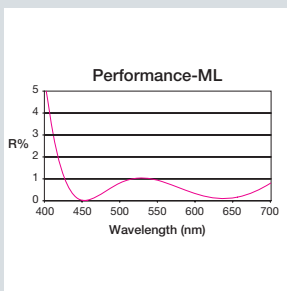
SL-201/501 cleaning and hard coating system



Bayer value 2-4
cycle time 27 min

Multiquartz Z-P

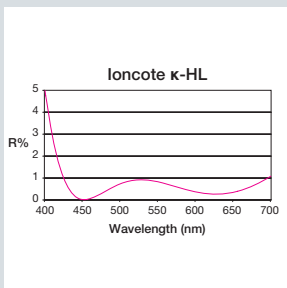
- High reduction of reflection
- SL top coat treatment
- AR process that covers almost all lacquered LI organic lenses. Can be used also for uncoated CR39
- High productivity process
- Available on MC-380 and 1200-DLF



Bayer value > 5
cycle time 28 min

Performance-ML

- Low cost AR process that covers almost all lacquered HI and LI organic lenses. Compatible with mineral lenses, too
- SL top coat treatment
- High scratch resistance on lacquered organic lenses
- High productivity process
- Available on MC-380 and 1200-DLF



Bayer value >12*
cycle time 34 min

Ioncote κ-HL

- Antistatic AR process that covers almost all lacquered HI and LI organic lenses
- SL top coat treatment with a very high ease of cleaning performance
- Antistatic
- Very high scratch resistance on lacquered organic lenses
- Available on MC-380 and 1200-DLF

* only on Satisloh lacquers

Hard Coating Options

Dip Coating Lacquers

Using the dual lacquer functionality of the SL-201/501 dip coater, it is possible to choose between a low index non-tintable lacquer (DN1500) or a 1.60 index non-tintable lacquer (DN1600). Both serve as the perfect base for any AR stack. Additionally it is possible to use also a primer (DP100) for better adhesion. DP100 is mandatory for coating of polycarbonate and factory hard coated lenses. Curing times of 2-3 hours generate excellent durability and hardness of Satisloh lacquers. SL lacquers can also be used on approved systems of other suppliers. Naturally Satisloh also offers the solvents for SL lacquer maintenance.

Dip Coating System

- Two capacity versions: SL-201 and SL-501
- Automatic operation
- 8 station ultrasonic cleaning system including surface etching, ultrasonic DI water rinsing, automatic slow lift out and drying station
- Lacquer pre-curing station with IR radiation
- Can be fully integrated as a part of Satisloh's lens coating suite (incl. AR and top coating)

AR Coating Options

Over the last 40 years Satisloh has developed many AR coating stack designs. As the sophistication and controllability of vacuum chambers have improved, it has become possible to develop very unique designs with specific hardness, refractive indices, optical performance, and other mechanical performance attributes.

Following are the five most popular and suitable Satisloh coating stacks.

- Multiquartz Z-P
- Performance-ML
- Ioncote κ-HL
- Easy-Coat
- Multicote

AR Coating System

Two different coating technologies for AR coating are available:

- Box coater: 1200-DLF and MC-380; well proven and excellent quality in terms of stability and reproducibility.
- Sputter coater: SP-200; suitable for small laboratories and wherever small batches are required.

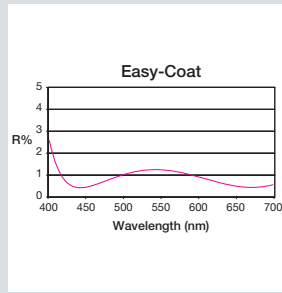


1200-DLF

MC-380



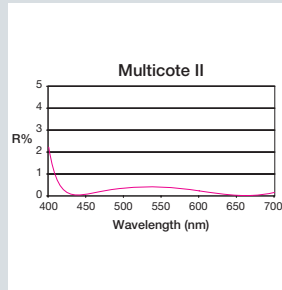
SP-200



Bayer value 4-8
cycle time 16 min

Easy-Coat Plastic

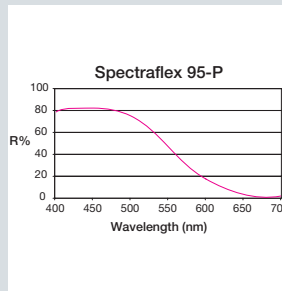
- AR process for lacquered HI and LI organic lenses
- High abrasion resistance
- SL top coat treatment in separate chamber
- Available on SP-200



Multicote II

- For mineral lenses of all indexes
- Very low residual reflection level
- High temperature process (300°C)
- SL top coat treatment
- High productivity process
- Available on MC-380 and 1200-DLF (corresponding process available on SP-200)

Mirror Coating



Spectraflex 95-P

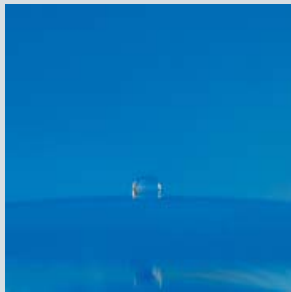
- Dielectric mirror coating
- Fashionable coating available in various reflection colours
- SL top coat treatment
- Application: sunglasses, sportive lenses and shields
- High productivity process (one side of the lens coating)
- Available on MC-380 and 1200-DLF (similar process available on SP-200)

Satisloh AR Process Summary for Organic Lenses

	DN1500/ 1600 Ioncote κ ⁺	Ioncote κ-HL	Performance- ML	Multiquartz Z-P	Easy-Coat
Bayer value	> 15*	> 12*	> 5	2-4	4-8
Antistatic	x	x	-	-	-
High index lacq. lenses	x	x	x	-	x
Low index lacq. lenses	x	x	x	x	x
Super hydro / extended life	x	-	-	-	-
Super hydro / oleophobicity	x	x	optional	optional	optional
Coating machine	MC-380/ 1200-DLF	MC-380/ 1200-DLF	MC-380/ 1200-DLF	MC-380/ 1200-DLF	SP-200
Cycle time per surface	38 min	34 min	28 min	27 min	16 min**

* only on Satisloh lacquers

** per two surfaces



Top Coating Options

Ease-of-care is perhaps the most important feature of AR coated lenses to the average customer. A naked AR coating is by nature rough and hydrophilic, meaning it will attract dirt, water and will be difficult to clean. Making the problem even worse is the fact that an AR coated lens will show the dirt more than a non-AR coated lens.

Fortunately, coating technology has advanced rapidly and there are a number of new chemical options available to make AR coating easier to clean than ever before. These chemicals are applied on top of AR (hence the term „top coating“) inside of a vacuum chamber. Satisloh has several options depending on the requested quality.

Hydrophobic vs Oleophobic

When the first easy care top coatings were introduced back in the late 1980's, they were loosely referred to as hydrophobic top coatings. Hydrophobic literally means "water-repellent" and the quality of a hydrophobic top coating has traditionally been measured by the contact angle of a drop of water on a lens. A higher contact angle (roundness of the drop of water) equates to a better hydrophobicity. Traditional hydrophobics typically have contact angles in the range of 97-104 degrees.

The newest generation of hydrophobic top coatings, referred to as super hydrophobics, have a contact angle in the range of 106-112 degrees. More important than its ability to repel water is a super hydrophobic's ability to repel oil and fingerprints, referred to as oleophobicity. The ease of removing fingerprints from the newest generation of AR lenses has resulted in a boom in AR penetration of US ophthalmic lens market.

All Satisloh hydrophobic or super hydrophobic materials can be evaporated directly inside the AR vacuum chamber or in a separate vacuum chamber.

1. Cleanvac

Low cost hydrophobic material with a contact angle of approx. 100° and unmatched oleophobicity.

2. Aulon

Traditional hydrophobic chemistry with a contact angle of approx. 104° and unmatched oleophobicity.

3. Satin

Super hydrophobic material with a contact angle of 110-114°. Generates exceptional ease of cleaning performance.

Complete Solution – Ioncote κ+

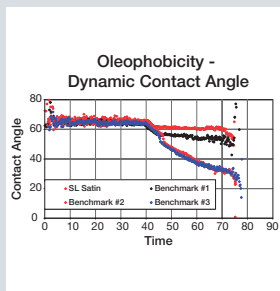
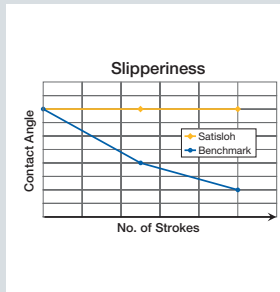
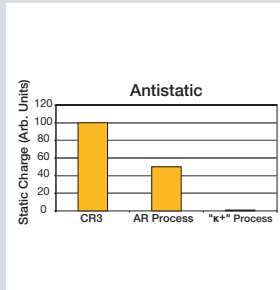
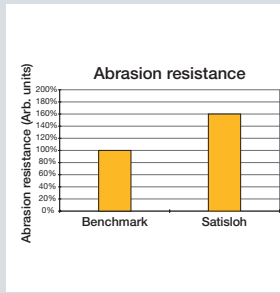
Satisloh lacquers DN1500 and DN1600 are specially tuned to reach together with the new Ioncote κ+ a high performance complete solution, which enables our customer to reach latest performance results on the ophthalmic lens market.

Hard Coating DN1500 & DN1600

- Specially developed for Ioncote κ+
- Available also for all other Satisloh AR coatings
- Available on most common substrates (low index, high index, polycarbonate)
- High abrasion resistance

AR Coating Ioncote κ+/Satin EL

- Specially developed and available only for DN1500 & DN1600 hard coatings
- Outstanding abrasion resistance
- Hydrophobic layer extended lifetime treatment
- Exceptional ease of cleaning performance
- Antistatic
- Cold process



Abrasion Resistance

Abrasion resistance of Ioncote κ+/Satin EL exceed by more than 50% the market benchmark. This outstanding hardness does not affect other coating characteristics such as thermal shock stability and environmental durability.

Antistatic

Antistatic property of the “κ” process family allows the lens to be cleaner from particle and dust, reducing the need for cleaning.

Extended Lifetime

The special treatment extended lifetime allows the hydrophobic layer to be more effective than the market benchmark even after a long lens life, meaning after a large number of cleaning cycles by dry wiping.

Ease of Cleaning

Satin has excellent ease of cleaning relative to the market benchmark. This can be shown easily by the dynamic contact angle measurement. A drop of oil is applied on the surface and removed by suction. The residual contact angles are continuously measured during generating and removing phase.



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