# NEWS RELEASE

1 November 2023
Nippon Sheet Glass Co., Ltd.

## NSG succeeds in developing SELFOC® Lens Array SLA 5EG employing 300µm extra-fine lens fibers Long Depth of Field, Compact, and High-Resolution lens

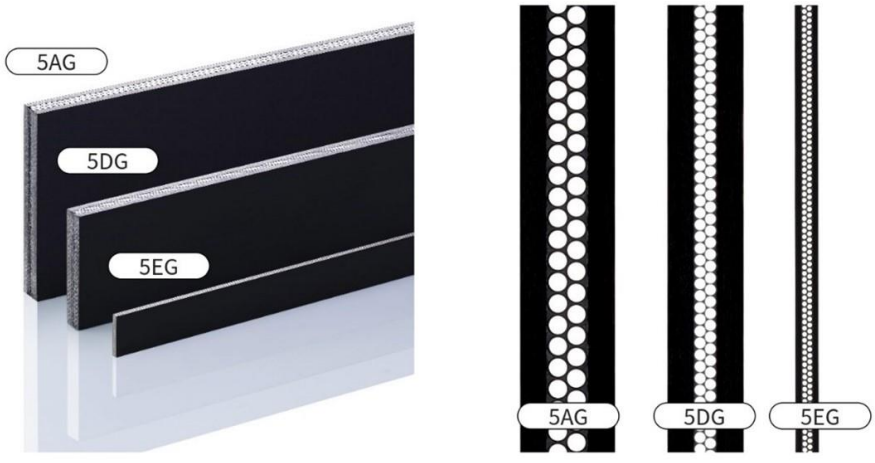
NSG Group is pleased to announce that it has developed SELFOC® Lens Array (SLA[*1]) 5EG, which has the combined characteristics of long DOF[*2], compactness and high-resolution, targeting at document scanners of multi-function printers for office-use as its application, where DOF requirement is high and SLA adoption rate is relatively low, in order to expand further the range of applications of SLAs, which are currently used primarily for CIS[*3] of scanners of multi-function printers for family-use.

SLA, developed by NSG, is a unique "plate"-shaped lens. As the product is more compact and enables more uniform image scanning compared with normal lenses, it achieves the number one largest share in lens array products for CIS of multi-function printers, banknote scanners, industrial inspection machines, etc.[*4]

SLA 5EG accomplishes the combined features of long DOF, compactness and high-resolution simultaneously. While in the conventional types of long DOF lenses of SLA 5AG and SLA 5DG, the height, thickness and working distance are relatively long, all of those parameters in SLA 5EG are successfully reduced, and volume (size) becomes astoundingly less than one tenth accordingly[*5] compared with the conventional long DOF lenses, enabled by the 300µm extra-fine lens fibers. The lens fibers densely and precisely arranged also realizes the improved resolution (MTF ave. at 300dpi) by 15 – 25%.

SLA 5EG is expected to be widely adopted for the applications that require long DOF and compactness, such as document scanners of multi-function printers for office-use currently supported by reduced lens-optical system, and Automated Optical Inspection in Machine Vision[*6].

Comparison: Conventional long DOF lenses of SLA 5AG and SLA 5DG, and new SLA 5EG




Overall size　　Lens fiber diameter

NSG will continue to address diverse requirements in the multi-function printer and the Machine Vision markets with the broadened product line up including recently developed products: SLA 5DG (long DOF type), SLA 5AG (long working distance type) and the newly developed SLA 5EG (long DOF and compact type).

## About NSG Group (Nippon Sheet Glass Co., Ltd. and its group companies)

NSG Group is the world's leading supplier of glass and glazing systems in the business areas of Architectural, Automotive, and Creative Technology.
Architectural manufactures and supplies architectural glass as well as glass for the solar energy and other sectors.
Automotive serves the original equipment (OE) and aftermarket replacement (AGR) glazing markets.
Creative Technology comprises several discrete businesses, including lenses for printers and scanners, specialty glass fibers and glass flakes, mainly glass cord, which is a reinforcing material for timing belts, and Fine Glass products.
http://www.nsg.com

**[Explanatory Note]**

*1 SLA: SELFOC® Lens Array

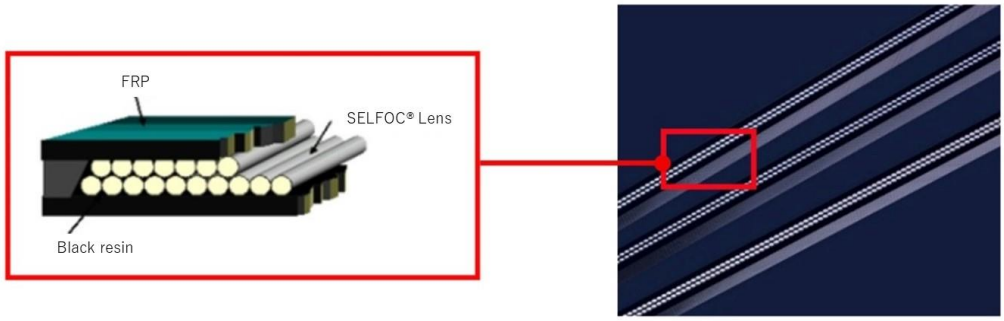



Photo: SLA

*2 DOF: Depth of Field. A range in the optic axis direction where a sharp image can be formed when an object is seen through a lens
*3 CIS: Contact Image Sensor. A line scan unit composed of SLA (Lens Array), light source and sensors
*4 Based upon NSG's internal analysis as of October 2023
*5 Volume (Size) of SLA 5EG: less than 3% of SLA 5AG and 7% of SLA 5DG
*6 Machine Vision: Industrial automation system (automated inspection, process control, etc.) performed by computed vision (so-called machine vision) instead of human eyes and vision.

## [Reference]

For details of SLA, please refer to the following website.
https://selfoc.jp/eng/product/sla/

**New product SLA 5EG: Performance Data**

| Lens type | | Optical dimensions | | | External dimensions | | Optical performance | | | Main applications |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Aperture angle (θ0) | Total conjugate (TC) | Working distance (Lo) | Thickness (T) | Lens length (Z) | MTF ave. at 300dpi | Depth of field | F# | |
| | | (Deg) | (mm) | (mm) | (mm) | (mm) | (%) | (mm) | | |
| Deep DOF, Long working distance | 5AG | 5 | (100) | 32.4 | 4.8 | 35.2 | 50 | ±1.3 | 5.9 | Machine vision |
| Deep DOF | 5DG | 5 | (54) | 17.2 | 3.9 | 19.6 | 60 | ±1.3 | 6.1 | |
| Deep DOF, Compact, High resolution | 5EG | 5 | (18.2) | 5.2 | 1.2 | 7.8 | 75 | ±1.3 | 5.4 | Machine vision, Scanner (Multi-funtion printer) |
| Compact, High resolution | 12EG | 12 | (9.9) | 2.8 | 1.2 | 4.3 | 85 | ±0.4 | 2.3 | Scanner (Multi-funtion printer) |

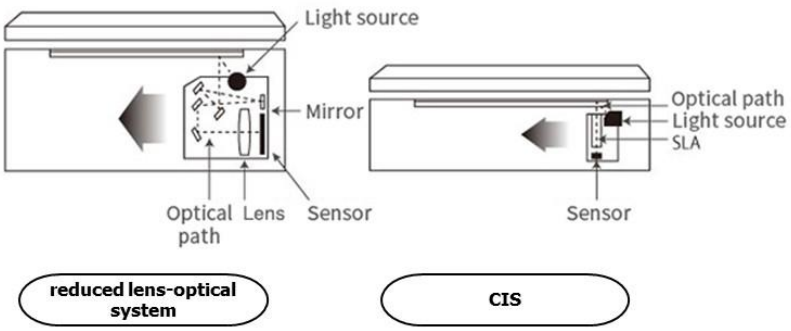
＊TC (Total Conjugate length): Distance between object and image sensor (design value)

＊Thickness (T) and Lens fiber length (Z) are estimated guaranteed values.

＊The other parameters and characteristics are estimated typical values.

＊DOF (Depth of Field): the range of ⊿WD (⊿Lo) where MTF ave. (at 6LP/mm=300dpi) is larger than 10%.

**Advantages of CIS vs. reduced lens-optical system**




- **Less parts/components**
- **Easy to assemble/ easy maintenance**
- **High illuminance efficiency with short working distance**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