

# OpticStudio®

## 20.2 Release Notes

May 19<sup>th</sup>, 2020

### 1 TOOLS, FEATURES, AND CAPABILITIES

#### 1.1 QUICK YIELD (PROFESSIONAL AND PREMIUM EDITIONS, SUBSCRIPTION ONLY)

**Get tolerancing predictions throughout the design process in a matter of seconds**

OpticStudio 20.2 has a new advanced capability which simulates full Monte Carlo tolerancing runs in a fraction of the time. This analysis should be used throughout the design process to guide design decisions as they pertain to creating more manufacturable systems. Quick Yield can be found in The Tolerance Tab > Quick Yield

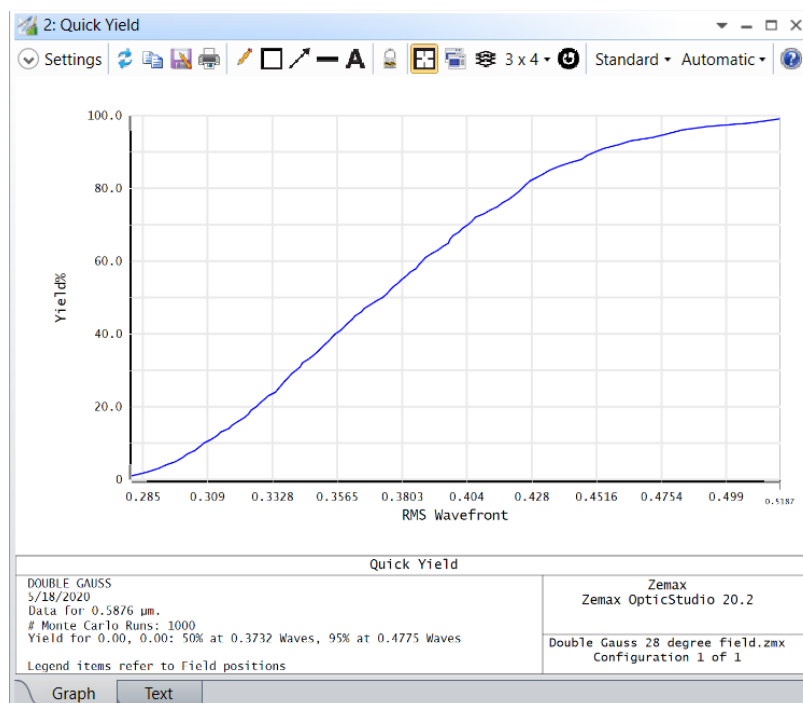


Figure 1.1.a The Quick Yield analysis

#### 1.2 TOLERANCE DATA VIEWER (ALL EDITIONS)

**A new streamlined viewer to easily access all sensitivity and Monte Carlo tolerance data**

Zemax

The Tolerance Data Viewer is a new viewer which displays all Monte Carlo and sensitivity data in a spreadsheet format. In addition to any data listed in the Tolerance Data Editor, this viewer also includes any reported data in a tolerance script. Additionally, as part of this viewer addition, tolerance runs can now be saved in .ZTD files, and opened in the other tolerance analyses as well. This viewer will open by default on the end of a tolerance run and can also be found in The Tolerance Tab > Tolerance Data Viewer.

The screenshot shows a window titled "Tolerancing Results: 1" with tabs for "Settings", "Monte Carlo", "Sensitivity", and "Summary". The "Monte Carlo" tab is active, displaying a table with columns for "RMS Wavefront", "COMP", and "TFRN", each with a "Statistics" sub-column. The table lists 12 Monte Carlo runs (MC\_1 to MC\_12) with their respective values for each parameter.

	RMS Wavefront Statistics	COMP Statistics	TFRN Statistics	TFRN Statistics
	Field: 0	Surf: 11	Surf: 1	
	Config: 0	Code: 0	Nominal: 0	Nom
	Nominal: 0.4156632727890	Nominal: 57.314537905	Min: -4	
	Sampling: 2	Min: -2	Max: 4	
	Comp: Paraxial Focus	Max: 2	Comment: Default radius to	Cor
	Fields: XY Symmetric	Comment: Default compens		
MC_1	0.381031	57.3145	3.96769	-0.3
MC_2	0.427482	57.3145	0.382583	0.3
MC_3	0.449325	57.3145	2.05024	-3.0
MC_4	0.485675	57.3145	-2.00141	0.3
MC_5	0.445719	57.3145	2.66684	0.3
MC_6	0.473348	57.3145	-0.269167	-1.0
MC_7	0.527955	57.3145	1.79024	-2.0
MC_8	0.435639	57.3145	-0.904918	-0.0
MC_9	0.486769	57.3145	-2.46262	2.0
MC_10	0.426814	57.3145	0.771085	-1.0
MC_11	0.46098	57.3145	-2.42861	0.3
MC_12	0.460342	57.3145	0.522754	-2.0

Figure 1.2.a The Tolerance Data Viewer

### 1.3 TOLERANCE HISTOGRAM (PROFESSIONAL AND PREMIUM EDITIONS, SUBSCRIPTION ONLY)

#### A new analysis displaying a histogram of data from any tolerance run

In OpticStudio 20.2 a tolerance histogram has been added which displays a histogram of any compensator, tolerance operand, or reported value during a tolerance run. This analysis can be found in The Tolerance Tab > Histogram.

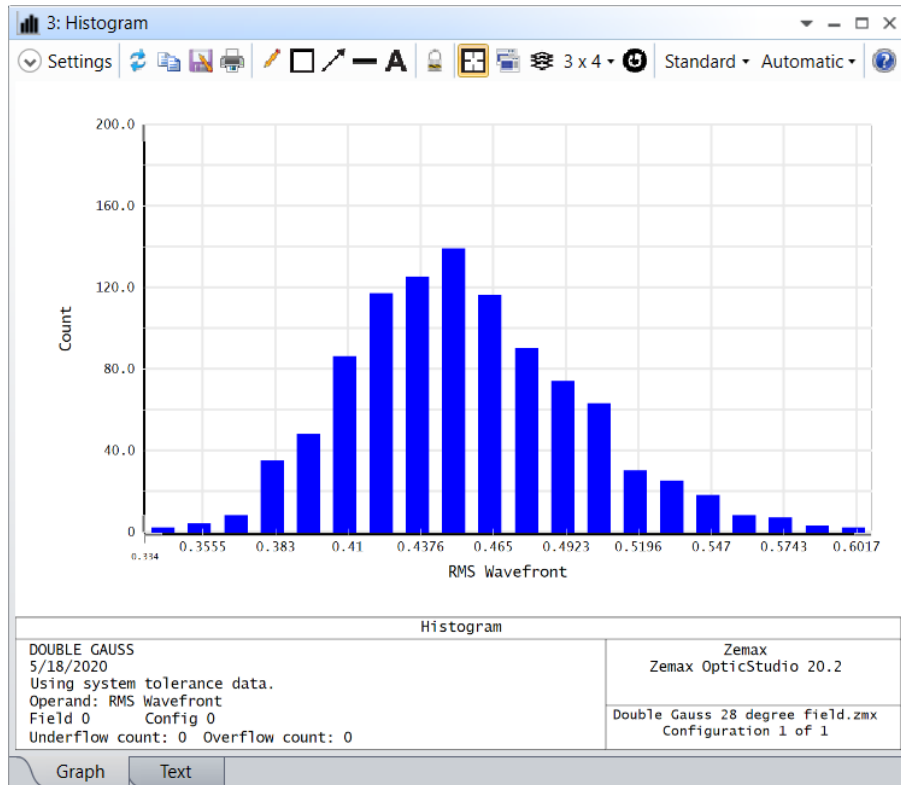


Figure 1.3.a The Histogram analysis

## 1.4 TOLERANCE YIELD (PROFESSIONAL AND PREMIUM EDITIONS, SUBSCRIPTION ONLY)

### A new analysis displaying a cumulative distribution function from any tolerance run

In OpticStudio 20.2 a tolerance yield analysis has been added which displays a cumulative distribution function of any compensator, tolerance operand, or reported value during a tolerance run. This analysis can be found in The Tolerance Tab > Yield.

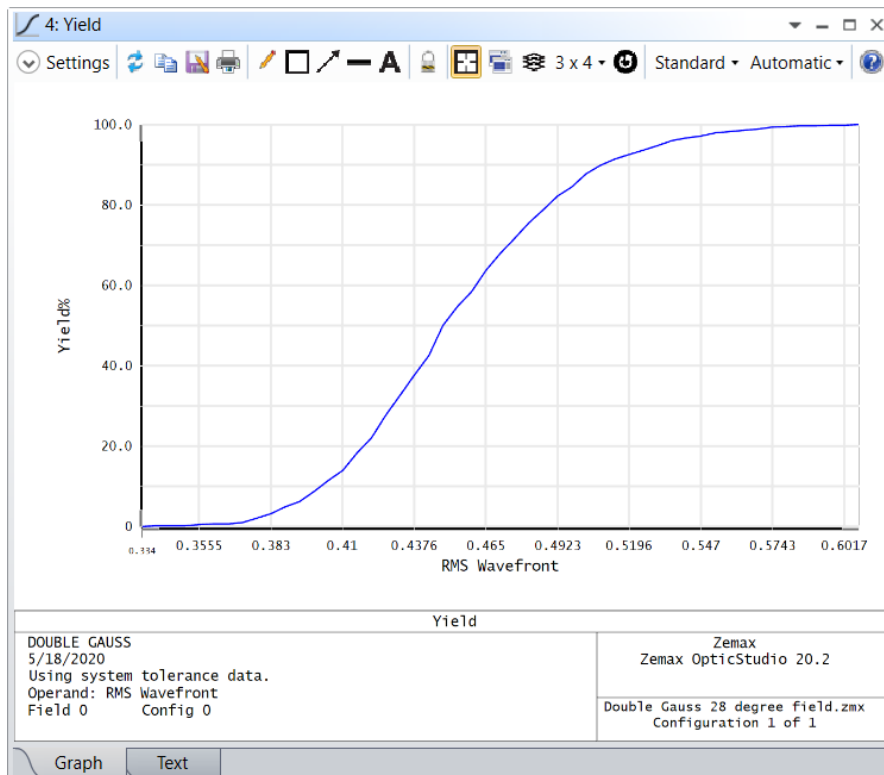


Figure 1.4.a The Yield analysis

## 1.5 OFF AXIS CONIC FREEFORM SURFACE (ALL EDITIONS)

### A new state-of-the-art parametric freeform surface

The Off Axis Conic Freeform surface is a new surface in OpticStudio constructed by a superposition of a conic segment and a polynomial. This surface is based on a paper by Dr. Jose Sasian from the university of Arizona.<sup>1</sup>

## 1.6 Q-FREEFORM SURFACE (ALL EDITIONS)

### A new state-of-the-art parametric freeform surface

The Q-Freeform surface is a new surface in OpticStudio described by a set of orthogonal 2D Q-polynomials. These so called 2D Q-polynomials can be expressed in terms of Jacobi Polynomials and were originally described by Dr. Greg W. Forbes<sup>2</sup>

## 1.7 DESIGN TEMPLATES DATABASE (ALL EDITIONS, SUBSCRIPTION ONLY)

### Easily and quickly find a starting point for your system

<sup>1</sup> Dmitry Reshidko, Jose Sasian, "A method for the design of unsymmetrical optical systems using freeform surfaces," Proc. SPIE 10590, International Optical Design Conference 2017, 105900V (27 November 2017); <https://doi.org/10.1117/12.2285134>

<sup>2</sup> "Characterizing the shape of freeform optics" <https://doi.org/10.1364/OE.20.002483>

Design Templates gives you an easy and convenient way to search for a new starting system that matches the base specifications you are looking for. You can search based on any information in the prescription data. Design Templates can be found in The Libraries Tab > Design Templates.

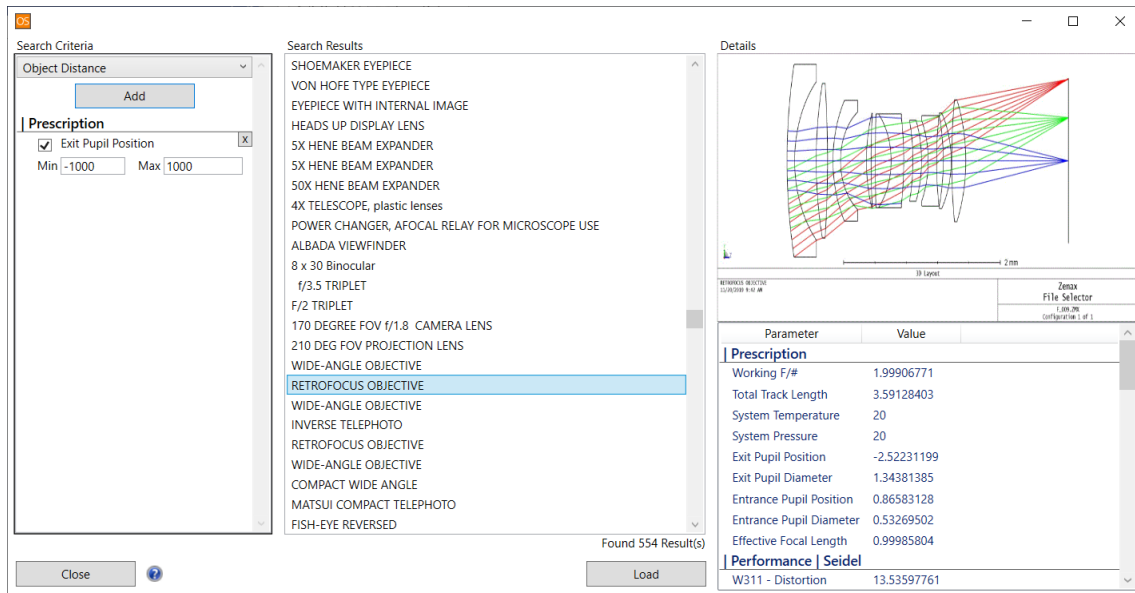


Figure 1.7.a The Design Templates tool

## 1.8 NEW DLL: SRG\_GRIDWIREPOLARIZER\_RCWA.DLL (PREMIUM EDITION, SUBSCRIPTION ONLY)

### Model Grid Wire Polarizer gratings with diffraction efficiency using this DLL

Using this new diffractive DLL, Grid Wire Polarizer gratings can now be modelled with accurate calculation of diffraction efficiency. This DLL can be used in non-sequential mode in the Diffraction Object Properties of the User Defined Object, Diffraction Grating. More information about this functionality can be found in the Knowledgebase article "[Simulating diffraction efficiency of surface-relief grating using the RCWA method](#)".

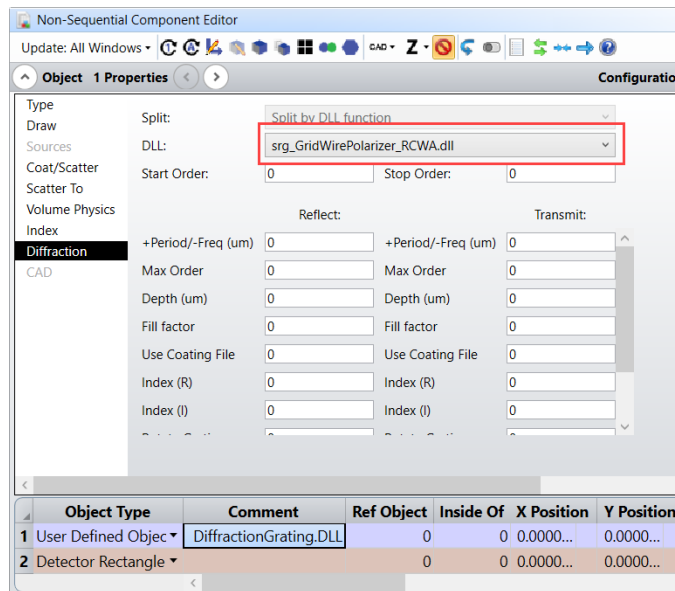


Figure 1.8.a This image shows where to select the DLL to use in OpticStudio

## 1.9 NEW USER EXTENSION: RCWA VISUALIZATION (PREMIUM EDITION, SUBSCRIPTION ONLY)

### A new method to visualize the RCWA Diffractive DLLs

Using this user extension, the `srg_trapezoid_RCWA.DLL`, `srg_GridWirePolarizer_RCWA.DLL`, and `srg_step_RCWA.DLL` can all be visualized within OpticStudio. This user extension can be found in The Programming Tab > User Extensions > RCWAvisualization. More information about this functionality can be found in the Knowledgebase article "[Simulating diffraction efficiency of surface-relief grating using the RCWA method](#)".

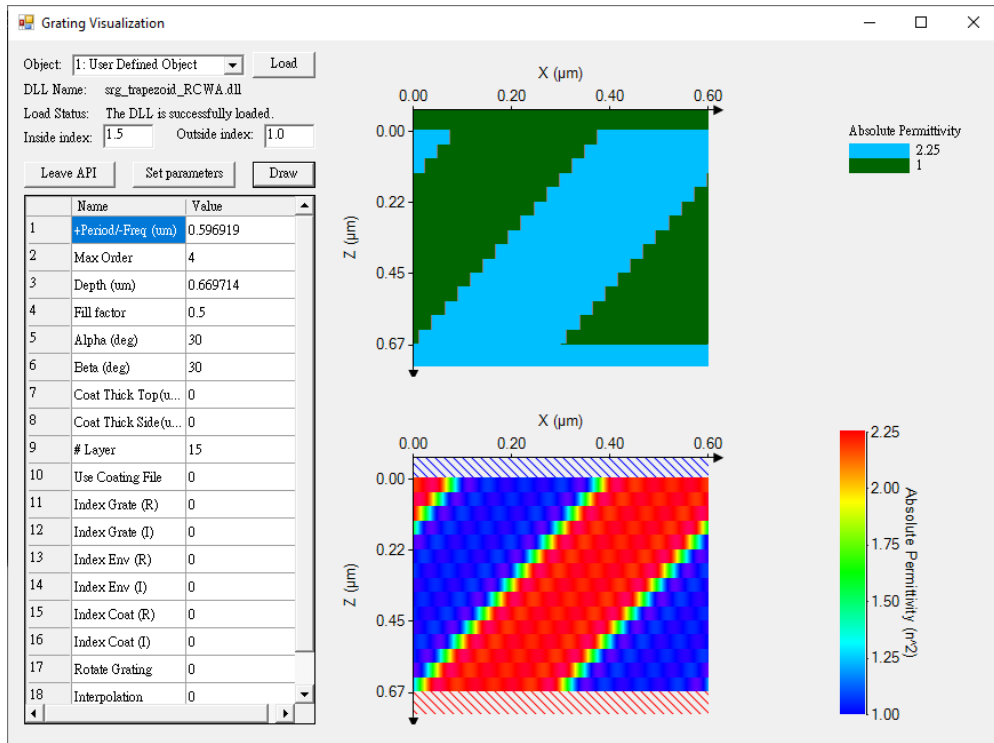


Figure 1.9.a The Grating Visualization user extension

## 1.10 NEW SOURCE DLL: SKEWRAYS CIRCULAR.DLL (ALL EDITIONS)

### Model gaussian beam propagation in non-sequential mode using skew rays

This Source DLL sends skew rays to model Gaussian Beam Propagation in non-sequential mode. Skew rays are an efficient and accurate representation of Gaussian beams and can be used to quickly optimize for best focus or to minimize aberrations. It is the non-sequential equivalent of Paul Colbourne's user defined surfaces: Using skew rays to model Gaussian beams: <https://my.zemax.com/en-US/Knowledge-Base/kb-article/?ka=KA-01772>).

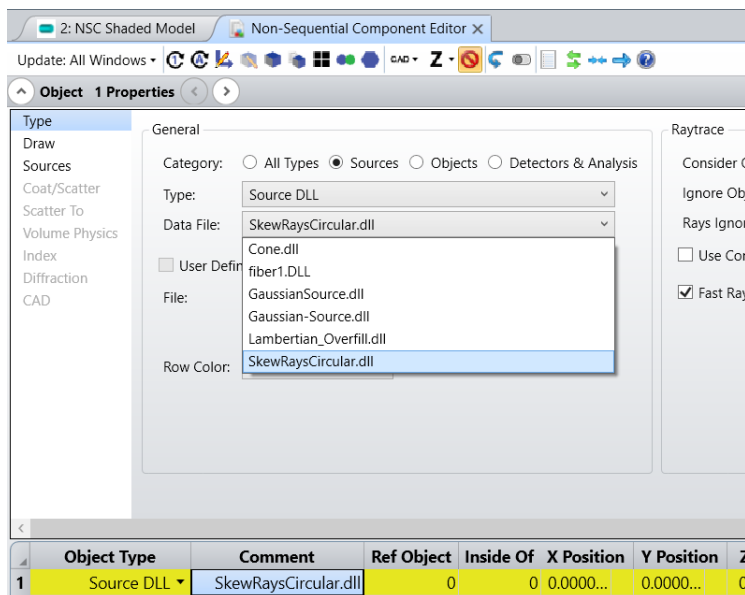


Figure 1.10.a The Skew Rays source DLL

## 1.11 COST ESTIMATOR: NEW VENDOR – LACROIX OPTICS (ALL EDITIONS)

### Get instantaneous estimates for lens manufacture

In OpticStudio 20.2 LaCroix Optics has joined the Cost Estimator tool! To enable LaCroix Optics as a Cost Estimator provider, navigate to System Explorer > Cost Estimator > Manage Providers. To sign up for a LaCroix Optics Cost Estimator account visit this site: <https://info.lacroixoptics.com/lacroix-precision-optics-cost-estimator>

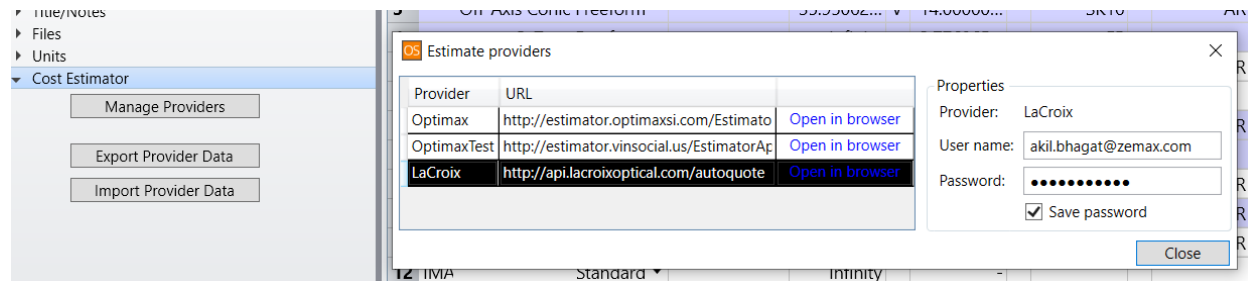


Figure 1.11.a Cost Estimator in the System Explorer

## 1.12 NEW OPERAND: CARD, CARDINAL POINTS (ALL EDITIONS)

### Calculate the In-Air EFL of any lens

CARD calculates the cardinal points of the system.

## 2 PROGRAMMING

### 2.1 ZOS-API PYTHON: .NET SUPPORT (PROFESSIONAL AND PREMIUM EDITIONS)

#### The ZOS-API through Python now supports the .NET framework

OpticStudio now supports and recommends using Python with the .NET framework in the ZOS-API. Since the ZOS-API is written using the .NET Framework, using languages that can directly communicate with .NET will give the most flexibility and the best performance. More information about this update can be found here: <https://my.zemax.com/en-US/Knowledge-Base/kb-article/?ka=KA-01951>

### 2.2 ZOS-API: IMAGE SIMULATION (PROFESSIONAL AND PREMIUM EDITIONS)

#### The ZOS-API now supports settings and results for Image Simulation

Using the ZOS-API the settings and results from the Image Simulation analysis are now available.

### 2.3 ZOS-API: PROJECT PREFERENCES – FOLDERS TAB (PROFESSIONAL AND PREMIUM EDITIONS)

#### The ZOS-API now supports accessing and changing the default folders

Using the ZOS-API the Project Preferences – Folders Tab is now accessible and can be changed.



## 2.4 ZOS-API: RELATIVE ILLUMINATION (PROFESSIONAL AND PREMIUM EDITIONS)

### The ZOS-API now supports settings and results for Relative Illumination

Using the ZOS-API the settings and results from the Relative Illumination analysis are now available.

## 3 USABILITY

### 3.1 PRESET TOLERANCES: CELL PHONE LENS (ALL EDITIONS)

#### New default tolerances for generic cell phone lens design

In the default tolerances found in the tolerancing wizard, there is a new addition of a generic cell phone lens tolerance. These tolerances are generalized numbers provided by industrial experts.

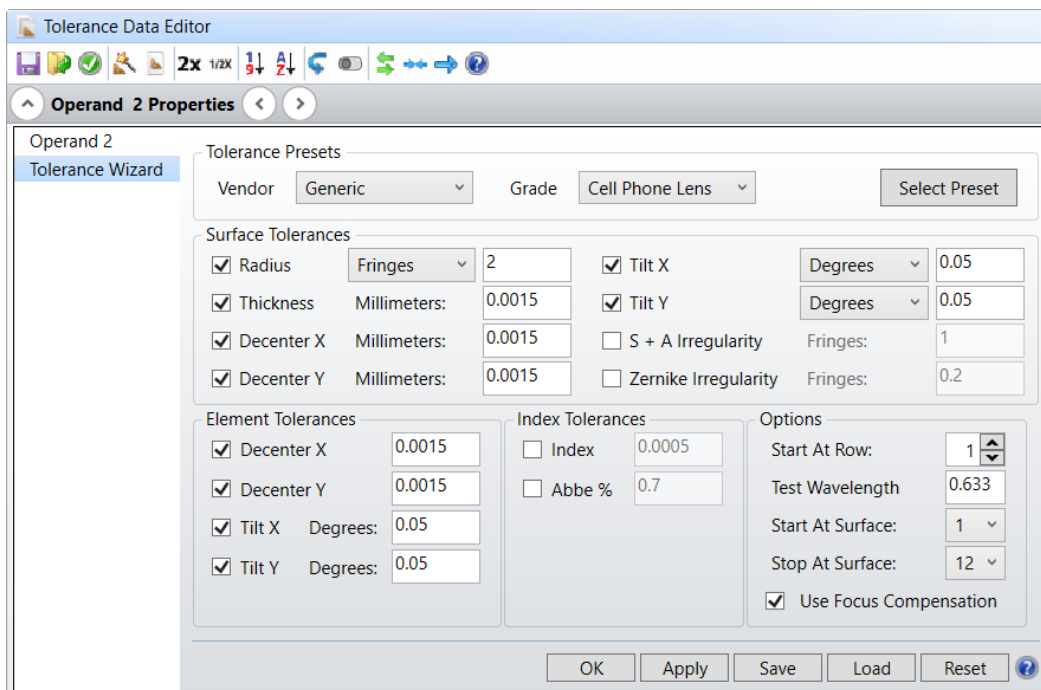


Figure 3.1.a The Cell Phone Lens generic tolerances

### 3.2 GRID POINT SELECTOR TOOL: SYMMETRY (PREMIUM EDITION, SUBSCRIPTION ONLY)

#### The Grid Point Selector tool now natively supports grid symmetry

When using the Grid Point Selector tool, variable symmetry can now be selected. The options are Left-Right, Up-Down or Fourfold. The selected region will be highlighted in blue, and the symmetry regions will be highlighted in red. The selected points will persist even after the tool is closed.

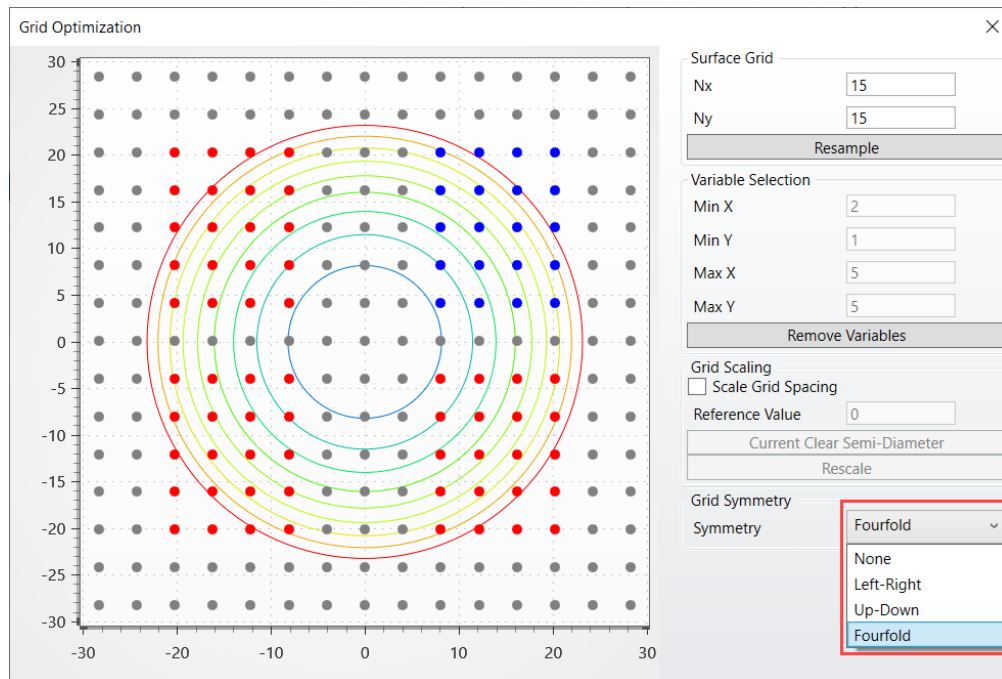


Figure 3.2.a The Grid Point Selector tool with fourfold symmetry

### 3.3 GETTING STARTED GUIDE: MOVED TO MYZEMAX.COM (ALL EDITIONS)

The Getting Started Guide has been removed from the software

To create more helpful and updated content, the Getting Started Guide has been removed from the software and will be maintained as a Learning Path on MyZemax. The Learning Paths can be found here: <https://my.zemax.com/en-US/learning-paths/>

## 4 LIBRARIES AND CATALOGS

### 4.1 CATALOG UPDATES (ALL EDITIONS)

Get the latest catalogs from Schott, DELO, Nikon-Hikari, Hikari, Ohara, LaCroix, and Edmund Optics

Material Catalogs

- The **SCHOTT Materials Catalog** has been updated. The data for the following materials has been modified: N-LAK14 and N-SF14. The material SF57HHT has been re-added to the catalog. This material has been discontinued and is listed as obsolete.
- The **DELO Materials Catalog** has been added. This new catalog contains the material DELO KATIOBOND OM614. This material is a transparent, UV curing epoxy material used for production of optical components such as lenses or diffractive optical elements in a replication process.
- The **NIKON-HIKARI Materials Catalog** has been updated to include several new materials: J-SFH4, J-SFH5, J-KZFH9, and J-PSKH8.
- The **HIKARI Materials Catalog** has been modified. The comment "See latest NIKON-HIKARI.AGF" was added. This file will not be updated anymore. All materials in HIKARI.AGF are also listed in NIKON-HIKARI.AGF. With this release, HIKARI.AGF becomes obsolete and users are advised to use NIKON-HIKARI.AGF instead.

- The **OHARA Materials Catalog** has been updated to include two new materials: S-PHM52Q and S-LAL12Q.
- The **LACROIX Materials Catalog** has been added. This new catalog contains all the materials the LaCroix Cost Estimator get instant pricing on and LaCroix can work with. There are 216 materials in total between Ohara, Schott and two types of Fused Silica.
- The **INFRARED Materials Catalog** has been updated. The internal transmission for GERMANIUM has been set to 1 from 2-15um. Also, dispersion coefficient C has been corrected.

#### Stock Lens Catalogs

- The **Edmund Optics Stock Lens Catalog** has been updated to include new TechSpec lenses 4794349038 recently added to their product line.

## 5 PERFORMANCE AND STABILITY IMPROVEMENTS

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OpticStudio 20.2 includes the following feature improvements:

#### Tools, Features, and Capabilities

- **CAD Export Tool** – Non-circular apertures are now better supported.
- **Gradient 12 Surface** – Fixed error when the Material column was not defined.
- **License Manager** – Allow setting the Default license in the Zemax License Manager without first opening OpticStudio
- **Field Data Editor** – The graphic visualization of field data points has been improved for systems with large fields of view defined by Angle.
- **Grid Point Selector** – General stability improvements
- **Prepare for OpticsBuilder** – Improvement to support a wider array of sequential systems
- **Critical Ray Trace** – Improved analysis results in non-sequential mode when using a Boolean Native object

#### Programming

- **Zernike+MSF DLL** – Updated the Zernike+MSF DLL to be non-rotationally symmetric which fixes issues with Ray Aiming and Paraxial Ray Traces.

## 6 BUG FIXES

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OpticStudio 20.2 includes the following bug fixes:

#### Tools, Features, and Capabilities

- **NSC Converter** – The Object positions have been improved when using Multi-Configurations.
- **Shortcuts** – Fixed issue where the Save option was removed from the Shortcut Keys in the Project Preferences
- **CAD Part Viewer** – The CAD Part Viewer now correctly interacts with all license types
- **SSAG Operand** – Updated to now return the correct values with both the Mechanical Semi-Diameter and the Semi-Diameter
- **Export to Point Cloud** – Now uses the correct Semi-Diameter when Include Normals is enabled

- **Single Mode Fiber Coupling** – The algorithm now correctly handles non-zero apodization factors when considering the source fiber