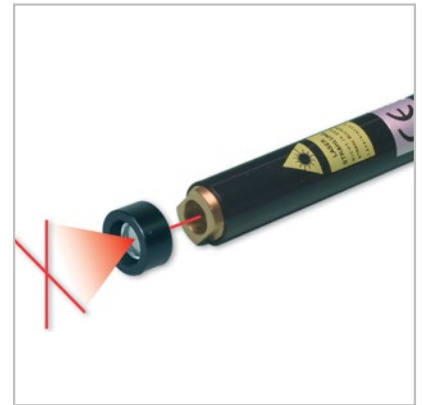


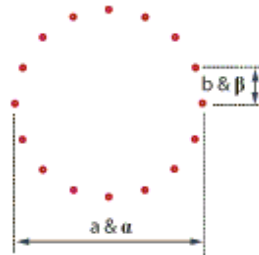
## Diffractive Optical Elements (DOE) for FLEXPOINT® Laser Modules





With the help of DOEs it is possible to turn a simple laser dot into a variety of different beam patterns.

All DOE's can be used with FLEXPOINT® laser modules, either fixed to the module or removable in a black plastic cap for multi-use with different laser modules.






### Circles & Dot Lasers

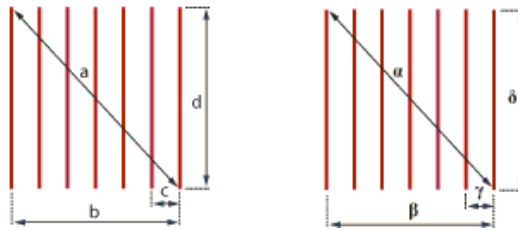







| DOE Item #     | Description       | Optimum Wavelength Range | Pattern Size @ 100 mm Distance |         | Pattern Angles (@ 635 nm) |         | Image   |
|----------------|-------------------|--------------------------|--------------------------------|---------|---------------------------|---------|---|
|                |                   |                          | a                              | b       | $\alpha$                  | $\beta$ |   |
| DOE-219        | Solid Line Circle | 480 - 600 nm             | 60 mm                          | -       | 34°                       | -       |  |
| DOE-220        | 1:16 Dot Circle   | 480 - 532 nm             | 106 mm                         | 20.8 mm | 56°                       | 11.9°   |  |
| DOE-221        | 1:72 Dot Circle   | 400 - 570 nm             | 44 mm                          | 1.94 mm | 25°                       | 1.11°   |  |
| DOE-229<br>NEW | 1:36 Dot Circle   | 530 nm                   | 7.2 mm                         | 0.6 mm  | 4.1°                      | 0.36°   |  |

Circles & Dot Lasers





| DOE Item #     | Description       | Optimum Wavelength Range | Pattern Size @ 100 mm Distance |        | Pattern Angles (@ 635 nm) |         | Image   |
|----------------|-------------------|--------------------------|--------------------------------|--------|---------------------------|---------|---|
|                |                   |                          | a                              | b      | $\alpha$                  | $\beta$ |   |
| DOE-238<br>NEW | Solid Line Circle | 530 nm                   | 7.3 mm                         | -      | 4.2°                      | -       |  |
| DOE-240        | 1:16 Dot Circle   | 530 - 700 nm             | 18.9 mm                        | 3.7 mm | 10.8°                     | 2.1°    |  |
| DOE-268        | Solid Line Circle | 488 - 532 nm             | 106 mm                         | -      | 56°                       | -       |  |

Multi Lines

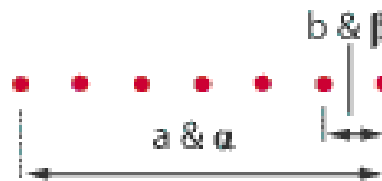






| DOE Item # | Description           | Optimum Wavelength Range | Pattern Size @ 100 mm Distance |         |         |         | Pattern Angles (@ 635 nm) |         |          |          | Image   |
|------------|-----------------------|--------------------------|--------------------------------|---------|---------|---------|---------------------------|---------|----------|----------|---|
|            |                       |                          | a                              | b       | c       | d       | $\alpha$                  | $\beta$ | $\gamma$ | $\delta$ |   |
| DOE-213    | 11 Lines (Square)     | 530 - 670 nm             | 76.3 mm                        | 54.1 mm | 5.4 mm  | 54.1 mm | 41.8°                     | 30.3°   | 3°       | 30.3°    |  |
| DOE-233    | 7 Lines (Square)      | 530 - 670 nm             | 54 mm                          | 38.2 mm | 6.4 mm  | 38 mm   | 30°                       | 22°     | 3.6°     | 22°      |  |
| DOE-250    | 5 Lines (Rectangular) | 590 - 670 nm             | 53 mm                          | 10.5 mm | 2.6 mm  | 52 mm   | 30°                       | 6°      | 1.5°     | 29°      |  |
| DOE-251    | 7 Lines (Rectangular) | 590 - 730 nm             | 15.2 mm                        | 8.8 mm  | 1.47 mm | 12.3 mm | 8.7°                      | 5.1°    | 0.84°    | 7°       |  |
| DOE-252    | 5 Lines (Square)      | 530 - 670 nm             | 43 mm                          | 30 mm   | 7.5 mm  | 30 mm   | 24°                       | 17.2°   | 4.3°     | 17.2°    |  |

### Multi Lines







| DOE Item # | Description                             | Optimum Wavelength Range | Pattern Size @ 100 mm Distance |       |         |       | Pattern Angles (@ 635 nm) |         |          |          | Image   |
|------------|---|--------------------------|--------------------------------|-------|---------|-------|---------------------------|---------|----------|----------|---|
|            |   |                          | a                              | b     | c       | d     | $\alpha$                  | $\beta$ | $\gamma$ | $\delta$ |   |
| DOE-253    | 11 Lines (Square, Thin Lines)           | 530 - 670 nm             | 76 mm                          | 54 mm | 5.4 mm  | 54 mm | 42°                       | 30°     | 3°       | 30°      |  |
| DOE-254    | 25 Lines (Square)                       | 530 - 670 nm             | 66 mm                          | 46 mm | 1.93 mm | 46 mm | 36°                       | 26°     | 1.09°    | 26°      |  |
| DOE-255    | 65 Lines (Square, Central Line Thicker) | 530 - 670 nm             | 44 mm                          | 31 mm | 0.48 mm | 31 mm | 25°                       | 17.6°   | 0.27°    | 17.6°    |  |
| DOE-284    | 41 Lines (Rectangular)                  | 600 - 700 nm             | 123 mm                         | 99 mm | 2.5 mm  | 75 mm | 63°                       | 53°     | 1.3°     | 41°      |  |

### Lines & Dot Lines




| DOE Item # | Description     | Optimum Wavelength Range      | Pattern Size @ 100 mm Distance |         | Pattern Angles (@ 635 nm) |         | Image   |
|------------|-----------------|-------------------------------|--------------------------------|---------|---------------------------|---------|---|
|            |                 |                               | a                              | b       | $\alpha$                  | $\beta$ |   |
| DOE-263    | 1:5 Dot Line    | 450 - 700 nm                  | 10.5 mm                        | 2.6 mm  | 6°                        | 1.54°   |  |
| DOE-264    | 1:9 Dot Line    | 630 - 780 nm                  | 1.49 mm                        | 0.19 mm | 0.85°                     | 0.11°   |  |
| DOE-265    | 1:19 Dot Line   | 500 - 540 nm,<br>630 - 690 nm | 24 mm                          | 1.31 mm | 13.4°                     | 0.75°   |  |
| DOE-266    | QC-Line - 5@633 | 630 - 690 nm                  | 8.7 mm                         | -       | 5°                        | -       |  |

### Lines & Dot Lines

| DOE Item # | Description      | Optimum Wavelength Range | Pattern Size @ 100 mm Distance |         | Pattern Angles (@ 635 nm) |         | Image   |
|------------|------------------|--------------------------|--------------------------------|---------|---------------------------|---------|---|
|            |                  |                          | a                              | b       | $\alpha$                  | $\beta$ |   |
| DOE-267    | QC-Line - 30@532 | 470 - 560 nm             | 32.5 mm                        | -       | 36°                       | -       |    |
| DOE-281    | 1:11 Dot Line    | 600 - 730 nm             | 28 mm                          | 2.8 mm  | 16°                       | 1.6°    |    |
| DOE-282    | 1:99 Dot Line    | 600 - 700 nm             | 32 mm                          | 0.33 mm | 18.4°                     | 0.19°   |    |
| DOE-283    | QC-Line - 20@633 | 630 - 670 nm             | 35 mm                          | -       | 20°                       | -       |   |
| DOE-286    | QC-Line - 30@660 | 600 - 700 nm             | 52 mm                          | -       | 29°                       | -       |  |
| DOE-287    | QC-Line - 45@660 | 600 - 700 nm             | 80 mm                          | -       | 44°                       | -       |  |

### Crosshair

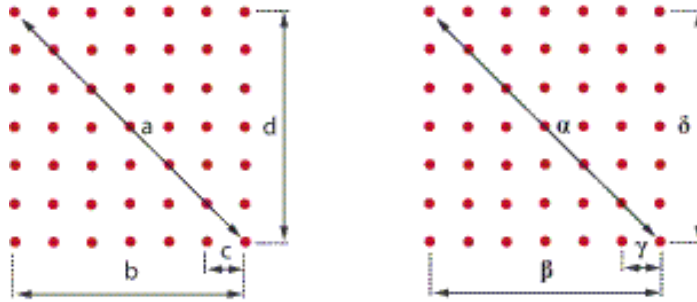











| DOE Item # | Description | Optimum Wavelength Range | Pattern Size @ 100 mm Distance |  | Pattern Angles (@ 635 nm) |  | Image   |
|------------|-------------|--------------------------|--------------------------------|--|---------------------------|--|---|
|            |             |                          | a                              |  | $\alpha$                  |  |   |
| DOE-205    | Cross - 5   | 650 nm                   | 9 mm                           |  | 5°                        |  |  |

## Crosshair


| DOE Item #     | Description                               | Optimum Wavelength Range | Pattern Size      | Pattern Angles | Image   |
|----------------|---|--------------------------|-------------------|----------------|---|
|                |   |                          | @ 100 mm Distance | (@ 635 nm)     |   |
|                |   |                          | $a$               | $\alpha$       |   |
| DOE-212        | Cross - 25@532                            | 500 - 640 nm             | 54 mm             | 30°            |    |
| DOE-214<br>NEW | Cross - 2@645                             | 600 - 645 nm             | 3.4 mm            | 1.9°           |    |
| DOE-218        | Cross - 15                                | 500 - 640 nm             | 26 mm             | 15°            |    |
| DOE-239<br>NEW | Cross - 5@520                             | 488 - 600 nm             | 10.5 mm           | 6°             |    |
| DOE-245        | Cross - 10                                | 570 - 690 nm             | 17.6 mm           | 10°            |   |
| DOE-246        | Cross with surrounding high contrast area | 530 - 670 nm             | 17.6 mm           | 10°            |  |
| DOE-247        | Cross - 25                                | 600 - 800 nm             | 44 mm             | 25°            |  |
| DOE-248        | Cross - 36                                | 530 - 550 nm             | 66 mm             | 36°            |  |
| DOE-249        | Cross - 45                                | 500 - 640 nm             | 83 mm             | 45°            |  |
| DOE-270<br>NEW | Cross - 30@640                            | 580 - 650 nm             | 53 mm             | 30°            |  |
| DOE-280        | Cross - 60                                | 580 - 690 nm             | 116 mm            | 60°            |  |
| DOE-289<br>NEW | Cross - 15@520                            | 520 - 535 nm             | 32 mm             | 18°            |  |

Dot Matrix







| DOE Item #     | Description    | Optimum Wavelength Range | Pattern Size @ 100 mm Distance |         |         |         | Pattern Angles (@ 635 nm) |         |          |          | Image   |
|----------------|----------------|--------------------------|--------------------------------|---------|---------|---------|---------------------------|---------|----------|----------|---|
|                |                |                          | a                              | b       | c       | d       | $\alpha$                  | $\beta$ | $\gamma$ | $\delta$ |   |
| DOE-206        | 17 x 17 Dots   | 590 - 730 nm             | 37 mm                          | 26 mm   | 1.6 mm  | 26 mm   | 21°                       | 14.6°   | 0.9°     | 14.6°    |    |
| DOE-223        | 2 x 2 + 1 Dots | 635 + 405 nm             | 28 mm                          | 19.9 mm | 19.9 mm | 19.9 mm | 16.1°                     | 11.4°   | 11.4°    | 11.4°    |  |
| DOE-231<br>NEW | 101 x 101 Dots | 635 - 680 nm             | 12.4 mm                        | 8.7 mm  | 0.09 mm | 8.7 mm  | 7°                        | 5°      | 0.05°    | 5°       |  |
| DOE-241        | 21 x 21 Dots   | 560 - 730 nm             | 11.9 mm                        | 8.4 mm  | 0.42 mm | 8.4 mm  | 6.8°                      | 4.8°    | 0.24°    | 4.8°     |  |
| DOE-242        | 16 x 16 Dots   | 530 - 730 nm             | 12.4 mm                        | 8.8 mm  | 0.59 mm | 8.8 mm  | 7.1°                      | 5°      | 0.34°    | 5°       |  |
| DOE-243        | 17 x 17 Dots   | 550 - 720 nm             | 12.4 mm                        | 8.8 mm  | 0.55 mm | 8.8 mm  | 7.1°                      | 5°      | 0.31°    | 5°       |  |
| DOE-244        | 13 x 13 Dots   | 570 - 730 nm             | 9.3 mm                         | 6.6 mm  | 0.55 mm | 6.6 mm  | 5.3°                      | 3.8°    | 0.31°    | 3.8°     |  |
| DOE-257        | 51 x 51 Dots   | 560 - 720 nm             | 55 mm                          | 39 mm   | 0.77 mm | 39 mm   | 31°                       | 22°     | 0.44°    | 22°      |  |
| DOE-258        | 11 x 11 Dots   | 590 - 690 nm             | 71 mm                          | 50 mm   | 5 mm    | 50 mm   | 39°                       | 28°     | 2.8°     | 28°      |  |

## Special Patterns

| DOE Item #     | Description                     | Optimum Wavelength Range | Pattern Size @ 100 mm Distance   | Pattern Angles @ 635 nm   | Image   |
|----------------|---------------------------------|--------------------------|--|---|---|
| DOE-215        | Viewfinder                      | 570 - 750 nm             | Width: 27 mm<br>Height: 17.7 mm<br>Diagonal: 32 mm                           | Width: 15.5°<br>Height: 10.1°<br>Diagonal: 18.2°                          |    |
| DOE-216        | Viewfinder (Dot Square)         | 405 - 488 nm             | Width: 12.5 mm<br>Height: 12.5 mm<br>Diagonal: 17.7 mm                       | Width: 7.1°<br>Height: 7.1°<br>Diagonal: 10.1°                            |    |
| DOE-234        | Viewfinder (Lines Square)       | 590 - 730 nm             | Width: 61 mm<br>Height: 61 mm<br>Diagonal: 86 mm                             | Width: 34°<br>Height: 34°<br>Diagonal: 47°                                |    |
| DOE-236<br>NEW | Solid Line Square               | 530 - 650 nm             | Width: 60.2 mm<br>Height: 60.2 mm<br>Diagonal: 85 mm                         | Width: 33.5°<br>Height: 33.5°<br>Diagonal: 46°                            |   |
| DOE-256        | Square Grid<br>51 x 51 Lines    | 530 - 660 nm             | Width: 39 mm<br>Height: 39 mm<br>Diagonal: 55 mm<br>Line Spacing: 0.77 mm    | Width: 22°<br>Height: 22°<br>Diagonal: 31°<br>Angle betw. Lines: 0.44°    |  |
| DOE-259        | 5 Rings                         | 530 - 700 nm             | Width: 51 mm<br>Line Spacing: 5.1 mm   | Width: 29°<br>Line Spacing: 2.8°  |  |
| DOE-260        | Viewfinder (Circle + Cross)     | 570 - 750 nm             | Width Cross: 37 mm<br>Circle Ø: 18.3 mm                                      | Width Cross: 21°<br>Circle Ø: 10.5°                                       |  |
| DOE-261        | Viewfinder (Dot Circle + Cross) | 570 - 750 nm             | Width Cross: 11 mm<br>Circle Ø: 8.8 mm<br>Dot Spacing: 1.1 mm                | Width Cross: 6.3°<br>Circle Ø: 5°<br>Angle betw. Dots: 0.63°              |  |
| DOE-262        | Viewfinder (Dot Square)         | 480 - 670 nm             | Width: 14.7 mm<br>Height: 14.7 mm<br>Diagonal: 21 mm<br>Dot Spacing: 0.63 mm | Width: 8.4°<br>Height: 8.4°<br>Diagonal: 11.9°<br>Angle betw. Dots: 0.36° |  |
| DOE-269        | 10 Rings                        | 488 - 532 nm             | Width: 126 mm<br>Line Spacing: 6.3 mm  | Width: 65°<br>Line Spacing: 3.2°  |  |

## Special Patterns

| DOE Item #            | Description  | Optimum Wavelength Range | Pattern Size @ 100 mm Distance                         | Pattern Angles @ 635 nm                          | Image  |
|-----------------------|--|--------------------------|--|--|--|
| DOE-285               | Hexagon  | 600 - 700 nm             | Width: 10.7 mm   | Width: 6.1°                                      |   |
| DOE-288               | Viewfinder   | 590 - 730 nm             | Width: 80.4 mm<br>Height: 52.0 mm<br>Diagonal: 95.6 mm | Width: 43.8°<br>Height: 29.1°<br>Diagonal: 51.1° |   |
| DOE-332<br><b>NEW</b> | 33000-Dot<br>Pseudo-Random<br>Pattern<br>(60°x42°@830nm) | 830 nm                   | Width: 82.0 mm<br>Height: 56.4 mm<br>Diagonal: 95.4 mm | Width: 44.6°<br>Height: 31.5°<br>Diagonal: 51.0° |   |
| DOE-335<br><b>NEW</b> | 33000-Dot<br>Pseudo-Random<br>Pattern<br>(46°x32°@650nm) | 650 nm                   | Width: 83.0 mm<br>Height: 55.2 mm<br>Diagonal: 98.8 mm | Width: 45.0°<br>Height: 30.9°<br>Diagonal: 52.6° |  |



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