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OF Product Line for Optical Fiber Primary Coatings

Our OF low Refractive Index primary coatings are distinguished by their carefully balanced combination of high adhesion to the core, and high modulus. The majority of our OF products include a proprietary adhesion promoter that dramatically improves adhesion to the core, especially under wet conditions. A special feature of our adhesion promoter is that it allows a relatively long shelf life of 6 months.

Our best-selling OF-136 (RI=1.36) is used by the majority of specialty optical fibers manufacturers. Its adhesion was optimized carefully for the highest value, while making sure it is not too high, to allow stripping.

OF-133-V2 (RI=1.33) enables a breakthrough Numerical Aperture of 0.6. Its close relative, OF-134-V2, couples a low index of 1.34 with a relatively high modulus of 20 MPa. The high NA of these products can significantly increase the efficiency of optical amplifiers and fiber lasers.

For demanding applications, customers choose the combination of very high modulus and very high adhesion offered by OF-138 (index 1.38), OF-139-N, and OF-140-N. These tough coatings are preferred for fibers that are subjected to high mechanical stresses and high temperatures.

Another notable product is OF-HC-14, which is our only secondary hard coat. The adhesion of OF-HC-14 to our primary coatings is about an order of magnitude higher, compared to similar commercially available hard coats.

| # | Material Name | RI at 589 nm | RI at 950 nm | Cure | Adhesion gr/cm | Elastic Modulus MPa | Viscosity CPS | Tensile Strength MPa | Elongation At Break % | Hardness Shore | Shelf Life Months |
|----|---------------|--------------|--------------|------|----------------|---------------------|---------------|----------------------|-----------------------|----------------|-------------------|
| 1 | OF-133-V3 | 1.337 | 1.333 | UV | 11 | 4 | 2400 | 1.3 | 50 | 60A | 6 |
| 2 | OF-134-V2 | 1.346 | 1.341 | UV | 28 | 17 | 2500 | 3.2 | 36 | 86A | 6 |
| 3 | OF-136 | 1.369 | 1.363 | UV | 64 | 85 | 2200 | 8.0 | 50 | 95A | 6 |
| 4 | OF-136-N | 1.369 | 1.363 | UV | 50 | 55 | 3200 | 6.0 | 52 | 95A | 12 |
| 5 | OF-1375-A | 1.377 | 1.372 | UV | 70 | 155 | 3700 | 8.3 | 54 | 95A | 6 |
| 6 | OF-138 | 1.384 | 1.379 | UV | 120 | 230 | 3300 | 10.0 | 62 | 52D | 6 |
| 7 | OF-140-N | 1.407 | 1.401 | UV | 56 | 560 | 3200 | 17 | 32 | 65D | 12 |
| 8 | OF-145-N | 1.455 | 1.448 | UV | 800 | 1100 | 3000 | 30 | 13 | 75D | 12 |
| 9 | OF-146-N | 1.467 | 1.460 | UV | >1500 | 1600 | 3800 | 37 | 3 | 80D | 12 |
| 10 | OF-HC-14 Hard | 1.468 | 1.462 | UV | na | 1400 | 3700 | 40 | 3.5 | 82D | 12 |



The Low Modulus LM Product Line

Our new series of LM (Low Modulus) products was designed for Cascaded Cladding Light Strippers.

In cascaded light strippers the recoating is done multiple adjacent segments, each with a gradually higher index. This technique enables gradual dissipation of the cladding power, preventing excessive, potentially catastrophic, heat build-up in a single hot spot.

The low modulus of the LM products reduces stress, and increases reliability, under thermal cycling.

LM products should be considered in various applications, where good endurance, under thermal cycling, and good adhesion, are important.

| # | Material Name | RI at 589 nm | RI at 950 nm | Cure | Adhesion gr/cm | Elastic Modulus MPa | Viscosity CPS | Tensile Strength MPa | Elongation At Break % | Hardness Shore | Shelf Life Months |
|----|---------------|--------------|--------------|------|----------------|---------------------|---------------|----------------------|-----------------------|----------------|-------------------|
| 1 | LM-136-EA | 1.369 | 1.363 | UV | 225 | 17 | 1700 | 4.0 | 80 | na | 9 |
| 2 | LM-1415 | 1.415 | 1.408 | UV | 600 | 17 | 1500 | 3.0 | 90 | na | 12 |
| 3 | LM-142-NI | 1.420 | 1.413 | UV | 700 | 13 | 1200 | 3.0 | 90 | na | 12 |
| 4 | LM-142-NI-10 | 1.415 | 1.407 | UV | 650 | 22 | 5400 | 4.0 | 100 | na | 6 |
| 5 | LM-144 | 1.439 | 1.432 | UV | 800 | 21 | 1900 | 5 | 140 | na | 12 |
| 6 | LM-1445 | 1.444 | 1.437 | UV | 1000 | 25 | 1900 | 5.5 | 150 | na | 12 |
| 7 | LM-145 | 1.449 | 1.442 | UV | 1200 | 30 | 1900 | 6 | 150 | na | 12 |
| 8 | LM-1455 | 1.455 | 1.448 | UV | 1600 | 32 | 1700 | 6 | 150 | na | 12 |
| 9 | LM-146 | 1.460 | 1.452 | UV | 1900 | 35 | 1400 | 7 | 160 | na | 12 |
| 10 | LM-146-NI | 1.460 | 1.454 | UV | 1100 | 22 | 1500 | 6 | 95 | NA | 12 |
| 11 | LM-1465 | 1.465 | 1.458 | UV | 1900 | 32 | 1800 | 6 | 160 | na | 12 |
| 12 | LM-147 | 1.470 | 1.462 | UV | 1900 | 31 | 2150 | 5 | 170 | na | 12 |
| 13 | LM-1475 | 1.475 | 1.467 | UV | 1200 | 36 | 1750 | 6 | 160 | na | 12 |
| 14 | LM-148 | 1.480 | 1.472 | UV | 500 | 42 | 1300 | 6.7 | 160 | na | 12 |
| 15 | LM-1485 | 1.485 | 1.477 | UV | 600 | 50 | 1280 | 7 | 150 | na | 12 |
| 16 | LM-149 | 1.490 | 1.482 | UV | 700 | 57 | 1280 | 7.7 | 160 | na | 12 |
| 17 | LM-155 | 1.550 | 1.540 | UV | 1200 | 50 | 2500 | 8 | 130 | na | 12 |

MY-130 UV Cured Optical Adhesives and Coatings

The MY-130 products are used for recoating and encapsulation in the manufacturing of photonic devices, such as pump power combiners, splitters, couplers, connectors, etc.

Enabling breakthrough in efficiency, MY-133-V2000, MY-133-EA, MY-132, MY-132A, MY-131 and MY-130 are becoming an important competitive tool in the photonics industry. The low Refractive Index of 1.30 to 1.33 reduces light leakage in various applications, enabling both higher efficiency and higher reliability. These products are field proven. The pioneering MY-133, has been in the field from 2004.

The best-selling products in this line are MY-133-V2000, and MY-136-V2000, followed by the newer MY-136, MY-132, MY-130, and MY-133-EA that has an integrated adhesion primer.

| # | Material Name | RI at 589 nm | RI at 950 nm | Cure | Adhesion gr/cm | Elastic Modulus MPa | Viscosity CPS | Tensile Strength MPa | Elongation At Break % | Hardness Shore | Shelf Life Months |
|----|---------------|--------------|--------------|------|----------------|---------------------|---------------|----------------------|-----------------------|----------------|-------------------|
| 1 | MY-130 | 1.308 | 1.303 | UV | Low | <1 | 120 | <0.2 | <10 | na | 12 |
| 2 | MY-131 | 1.314 | 1.311 | UV | Low | <1.5 | 150 | <0.2 | <10 | na | 12 |
| 3 | MY-132 | 1.324 | 1.320 | UV | 3 | 2.5 | 200 | na | <10 | 65A | 12 |
| 4 | MY-132-A | 1.326 | 1.322 | UV | 7 | 0.4 | 2600 | 0.3 | 80 | 30A | 12 |
| 5 | MY-132-V15K | 1.327 | 1.322 | UV | 40 | very low | 14500 | na | na | 7 | 12 |
| 6 | MY-133 | 1.336 | 1.331 | UV | 3 | 4.0 | 700 | 0.4 | 12 | 73A | 12 |
| 7 | MY-133-EA* | 1.338 | 1.333 | UV | 27 | 3.6 | 2300 | 1.0 | 45 | 62A | 6 |
| 8 | MY-133-V2000 | 1.333 | 1.329 | UV | 9 | 5.2 | 2900 | 2.4 | 60 | 70A | 12 |
| 9 | MY-136 | 1.364 | 1.360 | UV | 110 | 20 | 750 | 4.7 | 83 | 85A | 12 |
| 10 | RCT-136 | 1.369 | 1.363 | UV | 150 | 43 | 1700 | 5.4 | 56 | 70A | 9 |
| 11 | MY-136-V2000 | 1.369 | 1.363 | UV | 50 | 53 | 1700 | 6.0 | 50 | 93A | 12 |
| 12 | MY-1375 | 1.379 | 1.375 | UV | 60 | 108 | 4200 | 9.5 | 52 | 52D | 12 |
| 13 | MY-1375-V2000 | 1.380 | 1.375 | UV | 60 | 110 | 2000 | 9.0 | 40 | 95A | 12 |
| 14 | MY-138 | 1.388 | 1.382 | UV | 60 | 250 | 4000 | 12.0 | 62 | 60D | 12 |
| 15 | MY-139 | 1.393 | 1.388 | UV | 88 | 350 | 3500 | 11.5 | 40 | 60D | 12 |

* Improved adhesion under wet conditions



MY-140 UV Cured Optical Adhesives and Coatings

Distinguished by their strong adhesion and their robustness, the MY-140 products are used wherever there is a need for high bonding strength, coupled with low refractive index. Typical applications are for bonding of optical components, for re-coating cascaded Cladding Light Strippers.

The MY-140 product line technology is used in the field since the year 2000.

| # | Material Name | RI at 589 nm | RI at 950 nm | Cure | Adhesion gr/cm | Elastic Modulus MPa | Viscosity CPS | Tensile Strength MPa | Elongation At Break % | Hardness Shore | Shelf Life Months |
|----|---------------|--------------|--------------|------|----------------|---------------------|---------------|----------------------|-----------------------|----------------|-------------------|
| 1 | MY-140 | 1.407 | 1.401 | UV | 270 | 500 | 4200 | 17 | 30 | 65D | 12 |
| 2 | MY-141 | 1.414 | 1.409 | UV | 350 | 530 | 4000 | 17 | 45 | 68D | 12 |
| 3 | MY-142 | 1.420 | 1.416 | UV | 95 | 5.3 | 1050 | 3.7 | 100 | 70A | 12 |
| 4 | MY-142-D | 1.420 | 1.414 | UV | 400 | 500 | 3300 | 16 | 30 | na | 12 |
| 5 | MY-143* | 1.436 | 1.428 | UV | 1000 | 25 | 1200 | 3.1 | 71 | 80A | 12 |
| 6 | MY-145 | 1.450 | 1.445 | UV | 600 | 300 | 300 | 11.4 | 150 | 97A/6 | 12 |
| 7 | MY-1455 | 1.455 | 1.451 | UV | 600 | 400 | 250 | 15 | 60 | 50D | 12 |
| 8 | MY-146 | 1.461 | 1.456 | UV | 1400 | 515 | 150 | 17.4 | 22 | 95A/6 | 12 |
| 9 | MY-146-LM1 | 1.459 | 1.453 | UV | 500 | na | 465 | na | na | 65A | 12 |
| 10 | MY-1465 | 1.465 | 1.460 | UV | 800 | 160 | 160 | 10.6 | 140 | 87A | 12 |
| 11 | MY-147 | 1.470 | 1.465 | UV | 1000 | 270 | 250 | 11.6 | 174 | 64D | 12 |
| 12 | MY-1473 | 1.474 | 1.469 | UV | 1700 | 555 | 150 | 14.8 | 90 | 60D | 12 |
| 13 | MY-148 | 1.480 | 1.474 | UV | 830 | 580 | 185 | 16.7 | 90 | 65D | 12 |
| 14 | MY-149 | 1.490 | 1.483 | UV | 1400 | 1.3 | 900 | 0.63 | 300 | na | 12 |
| 15 | MY-150 | 1.496 | 1.487 | UV | 1100 | 5.5 | 2000 | 2 | 340 | na | 6 |
| 16 | RCT-155 | 1.550 | 1.540 | UV | 50 | 50 | 2100 | 7 | 100 | na | 12 |

* Improved adhesion under wet conditions



Dual Cure (Heat + UV) Products

Our Dual Cure (DC) products find a growing number of applications as adhesives, coatings and sealants. All our Dual Cure materials are one component materials. They are cured by either UV radiation, Heat, or a combination of both. This feature enables curing in partially or fully shaded regions of the device.

The DC line includes both flexible and rigid products with a refractive index from 1.33 to 1.50, with relatively big selection close to the index of silica. These include DC-1455 (flexible, index=1.448 at 950 nm) and DC-1455-HM and (Rigid, index=1.451) The DC line also includes high bond strength products like DC-150 (flexible) and DC-1473 (rigid).

The newest members of the DC line are DC-152 (index=1.52) and DC-157 (index=1.57).

| # | Material Name | RI at 589 nm | RI at 950 nm | Cure | Adhesion gr/cm | Elastic Modulus MPa | Viscosity CPS | Tensile Strength MPa | Elongation At Break % | Hardness Shore | Shelf Life Months |
|---|---------------|--------------|--------------|-------|----------------|---------------------|---------------|----------------------|-----------------------|----------------|-------------------|
| 1 | DC-133 | 1.335 | 1.330 | UV/HE | 5 | 3 | 2200 | 1.0 | 40 | 68 | 12 |
| 2 | DC-136 | 1.366 | 1.360 | UV/HE | 180 | 9 | 600 | 2.4 | 70 | 83 | 12 |
| 3 | DC-145 | NA | 1.449 | UV/HE | 1200 | 30 | 1900 | 6 | 150 | 84 | 12 |
| 4 | DC-146 | 1.461 | 1.454 | UV/HE | 2000 | 17 | 1200 | 4.3 | 170 | NA | 12 |
| 5 | DC-150 | NA | 1.478 | UV/HE | >1000 | 23 | 1800 | 4 | 450 | NA | 12 |



The -NI Products

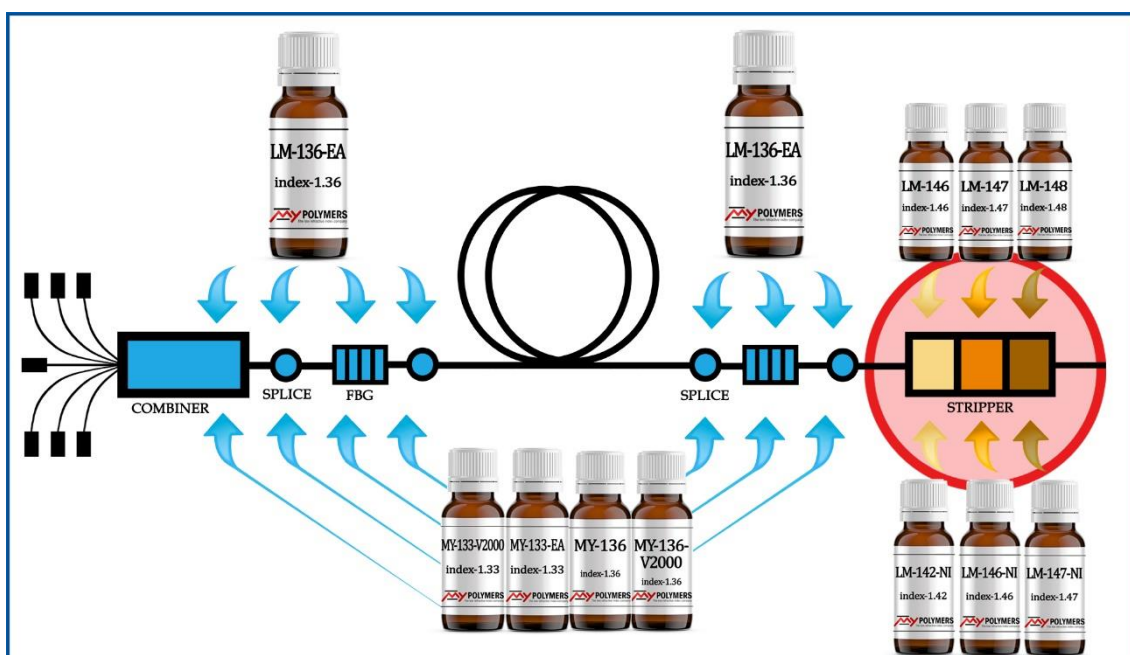
Our new series of -NI products are a new extension of the LM (Low Modulus) Product Line and the MY (medium to High Modulus) products line.

The -NI products are distinguished by 2 additional properties:

- (1) They are less sensitive to oxygen inhibition. This means the products can achieve good surface curing even when an inert atmosphere cannot be provided.
- (2) They are optimized for good curing under LED UV spot curing systems, as well as the older, more established, mercury lamp spot curing systems.

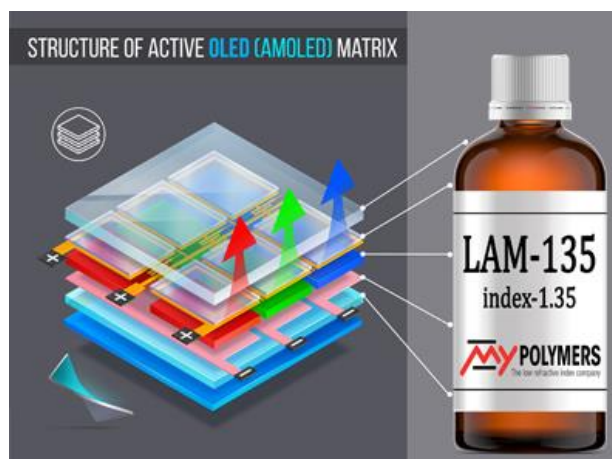
The addition of these features enhances the ease of use of the -NI line.

| # | Material Name | RI at 589 nm | RI at 950 nm | Cure | Adhesion gr/cm | Elastic Modulus MPa | Viscosity CPS | Tensile Strength MPa | Elongation At Break % | Hardness Shore | Shelf Life Months |
|---|---------------|--------------|--------------|------|----------------|---------------------|---------------|----------------------|-----------------------|----------------|-------------------|
| 1 | LM-142-NI | 1.423 | 1.417 | UV | 1000 | 28 | 3200 | 3 | 110 | NA | 12 |
| 2 | LM-142-NI-10 | 1.415 | 1.407 | UV | 650 | 22 | 5400 | 4.0 | 100 | na | 6 |
| 3 | LM-146-NI | 1.460 | 1.454 | UV | 1100 | 22 | 1500 | 6 | 95 | NA | 12 |



LAM Adhesives

| # | Material Name | RI at 589 nm | RI at 950 nm | Cure | Adhesion gr/cm | Elastic Modulus MPa | Viscosity CPS | Tensile Strength MPa | Elongation At Break % | Hardness Shore | Shelf Life Months |
|---|---------------|--------------|--------------|------|----------------|---------------------|---------------|----------------------|-----------------------|----------------|-------------------|
| 1 | LAM-134 | 1.346 | 1.341 | UV | 200 | NA | 17000 | NA | NA | NA | 12 |
| 2 | LAM-135 | 1.355 | 1.350 | UV | 500 | NA | 4000 | NA | NA | NA | 12 |
| 3 | LAM-136 | 1.367 | 1.360 | UV | 400 | NA | 6000 | NA | NA | NA | 12 |

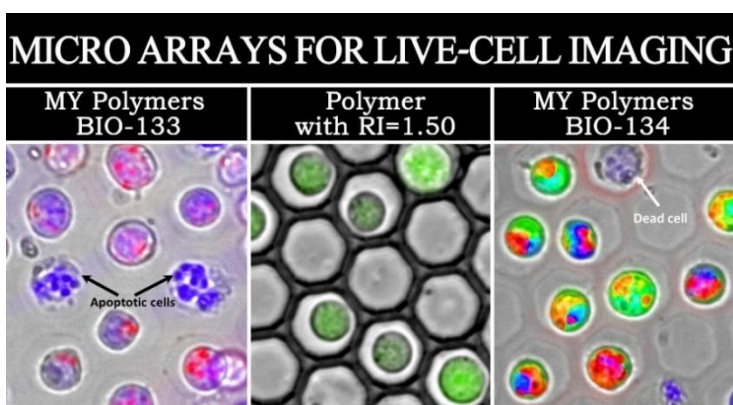


Bio-Photonic Polymers

Our dedicated bio-Photonic polymers BIO-133 and BIO-134 were designed to minimize cytotoxicity and fluorescence. The index of BIO-133/4 matches the refractive index of water and cells. This enables construction of 3-D structures, such as micro-wells and micro-pillars, which do not distort the images. A breakthrough in microscopy image quality, thanks to the use of BIO-133/4, was demonstrated.

Microfluidic devices produced with MY-133-V2000 or BIO-133 (index=1.33) reduce artifacts in fluorescence and quantitative phase imaging, due to index matching.

| # | Material Name | RI at 589 nm | RI at 950 nm | Cure | Adhesion gr/cm | Elastic Modulus MPa | Viscosity CPS | Tensile Strength MPa | Elongation At Break % | Hardness Shore | Shelf Life Months |
|---|---------------|--------------|--------------|------|----------------|---------------------|---------------|----------------------|-----------------------|----------------|-------------------|
| 1 | BIO-133 | 1.334 | 1.329 | UV | na | 5 | 2200 | na | 60 | 70 | 6 |
| 2 | BIO-134 | 1.342 | 1.337 | UV | na | 5.6 | 5500 | na | 36 | 71 | 6 |



Moisture Cured Optical Coatings

Our Moisture Cured coatings cure spontaneously by absorbing moisture from the air. The moisture curing feature makes these products especially useful as coatings for surfaces. Since there is no UV curing (and no need for an inert atmosphere) it is simple to coat large surfaces, as well as complex geometries (geometries that would not allow UV curing due to blocking of UV radiation).

Our Moisture Cured coatings include 2 groups of products:

1.The MY-131/2/3/6-MC products:

These moisture cured products have very low index of 1.31, 1.32, 1.33 and 1.36. Their abrasion resistance is relatively low. They are selected where the low index gives a special benefit. For example, MY-133-MC is used in the production of SPR biosensors, that requires a coating with an index of 1.33 (the RI of water, and cell tissues is also 1.33). In this application, the MY-133-MC is coated over the surface of a glass wafer, using spin coating.

2.The AR products (AR-138, AR-139, AR-141):

The AR products are hard anti-reflective coatings, with refractive index of 1.38 – 1.41. These products are liquid repelling, allowing easy removal of grease, various oils, solvents and water. The AR coatings are Moisture Cured. They are supplied as 60% solids solution.

With pencil hardness of 2H – 1H, these coatings provide good abrasion resistance.

| # | Material Name | RI at 589 nm | RI at 950 nm | Cure | Adhesion gr/cm | Elastic Modulus MPa | Viscosity CPS | Tensile Strength MPa | Elongation At Break % | Hardness Shore | Shelf Life Months |
|---|---------------|--------------|--------------|------|----------------|---------------------|---------------|----------------------|-----------------------|----------------|-------------------|
| 1 | MY-131-MC | 1.312 | 1.308 | MC | na | na | 120 | na | na | V. Soft | 6 |
| 2 | MY-133-MC | 1.330 | 1.325 | MC | na | na | 400 | na | na | Soft | 6 |
| 3 | MY-136-MC | 1.36 | 1.36 | MC | na | na | 5000 | na | na | 4B | 6 |
| 4 | AR-138 | 1.389 | 1.384 | MC | Str. | na | 150 | na | na | 1H | 4 |
| 5 | AR-139 | 1.395 | 1.391 | MC | Str. | na | 150 | na | na | 2H | 6 |
| 6 | AR-141 | 1.412 | 1.407 | MC | Str. | na | 150 | na | na | 2H | 4 |



Adhesion Primers

The adhesion primers increase the adhesion of low index adhesives, such as MY-133-V2000, BIO-133, or BIO-134 to various materials.

Optimal primer selection depends on function and materials. For example, PRIMER-G is frequently used to enable good adhesion of an optical fiber recoated with MY-133-V2000 to a glass ferule.

However, to enhance adhesion to the surface of a component that is in the optical path, where a low RI at the boundary is necessary, PRIMER-LC should be used. All these primers are solvent borne (25% solids). They are applied to the surface and allowed to dry out. After the application of the Low RI adhesive they undergo UV curing simultaneously with the top adhesive.

| # | Material Name | RI at 589 nm | RI at 950 nm | Cure | Adhesion gr/cm | Elastic Modulus MPa | Viscosity CPS | Tensile Strength MPa | Elongation At Break % | Hardness Shore | Shelf Life Months |
|---|---------------|--------------|--------------|------|----------------|---------------------|---------------|----------------------|-----------------------|----------------|-------------------|
| 1 | PRIMER-LC | 1.333 | 1.321 | SB | 150 | na | na | na | na | na | 12 |
| 2 | PRIMER-G | 1.430 | 1.424 | SB | 150 | na | na | na | na | na | 12 |
| 3 | PRIMER-P | 1.430 | 1.424 | SB | 150 | na | na | na | na | na | 12 |

Inkjet compatible low index optical polymer for 3D printing

JET-144, a first in a series of low index inkjet compatible materials, was recently introduced.

This optically clear material has an index of 1.44 and has the required properties for good inkjet compatibility, including the right surface tension and viscosity.

Designed primarily for piezoelectric DOD inkjet print heads, the material requires a relatively low dose of UV radiation for curing. It has strong adhesion, and relatively low modulus, which allows good endurance under thermal cycling and thermal shocks.

JET-144 will be complemented over the next few months with other inkjet compatible products, with lower index and higher index.

| # | Material Name | RI at 589 nm | RI at 950 nm | Cure | Adhesion gr/cm | Elastic Modulus MPa | Viscosity CPS | Tensile Strength MPa | Elongation At Break % | Hardness Shore | Shelf Life Months |
|---|---------------|--------------|--------------|------|----------------|---------------------|---------------|----------------------|-----------------------|----------------|-------------------|
| 1 | JET-144 | 1.447 | 1.439 | UV | Good | na | 15.3 | na | na | na | 12 |

Custom Products

MY Polymers provides customized products.

It may be:

- * a different Refractive Index;
- * higher or lower viscosity;
- * higher Modulus (harder) or lower (softer);
- * higher or lower bond strength;
- * a different cure method or schedule; etc.

For a detailed discussion, please feel free to [Contact Us](#)

