INTEMATIX
Innovative Materials Solutions

FAQ – ChromaLit™ Light Sources

1. What are ChromaLit products from Intematix?
    a. ChromaLit is a patented remote phosphor light source that offers beautiful light quality with unprecedented design freedom, color control, system flexibility and efficiency. When energized with a blue LED energy source, our ChromaLit products produce glare free, uniform lighting, and improves system efficacy by up to 30%. Through proprietary coating and molding methods, Intematix integrates its world leading phosphor materials into solid shapes. These function as the primary light source in solid state luminaires.
2. What is remote phosphor?
    a. Remote phosphor generically describes the lighting system architecture ChromaLit enables. Whereas conventional white LED light sources implement phosphor deposited directly on a blue LED chip, ChomaLit architectures place the phosphor part of the system remotely from the blue LED chip. Hence the design is typically referred as remote phosphor.
3. Does ChromaLit perform better than white LEDs?
    a. Yes, ChromaLit performs considerably better than white LEDs (where the phosphor is deposited directly on the blue LED chip) in four major dimensions
        i. luminaire design freedom
        ii. manufacturing operational efficiency
        iii. light quality
        iv. up to 30% higher system efficacy.
4. How exactly does a ChromaLit system have higher efficacy than a white LED system.
    a. ChromaLit derives its efficacy advantage over white LEDs from three major areas, lower operating temperature, elimination of diffuser to reduce glare and increased light extraction. Since ChromaLit operates remotely from the high temperature LED chip it produces light more efficiently and in a more stable way which also improves dimming performance. Since the light from ChromaLit sources is already diffuse and uniform, the additional diffuser required in conventional LED systems is removed increasing efficacy. Finally, the LED to phosphor interface in conventional systems is a cause of light reflection and absorption. The physical separation of ChromaLit offers more conversion and transmission of light.
5. What is the origin of the trademark ChromaLit?
    a. ChromaLit is a single word name (while the L is capitalized in use) proprietary to Intematix for its product and technology. The name encapsulates the concepts of broad color and lighting which are major benefits offered to lighting systems.

6. What applications are using ChromaLit products today?
    a. ChromaLit was launched to the marketplace in January 2011 and is enabling lighting performance in several prominent application areas. These include down lights, spot lights, linear lighting troffers, light modules, colored signals, signs, displays and vehicle interior. Many more applications are expected in the future.
7. What ChromaLit products can I order from Intematix today?
    a. ChromaLit offers tremendous flexibility and we want to work with customers to make the ChromaLit source that works best for them. For fastest delivery, orders may be placed for products that Intematix already has in production, through our channel partner, DigiKey www.DigiKey.com . Please see our product selector guide for available shapes and colors.
8. What are the optical design considerations for directing the blue light energy to ChromaLit?
    a. The mixing chamber design is very important to fully realizing the benefits of the ChromaLit system. The key design goals are to deliver the blue radiation to the ChromaLit, efficiently, uniformly and diffusely. To get this, you need to meet 3 basic requirements.
        i. The interior of the mixing chamber must be a highly reflective, diffuse material.
        ii. The mixing chamber must have enough height to properly mix
        iii. The blue LED should have a wavelength between 450 to 460nm and target 455nm on average. Intematix offers a reference design to support customer designs.
9. Do you offer optical design support?
    a. While optical design of the mixing chamber and any secondary optics are primarily the responsibility of the luminaire maker, Intematix does have reference designs available and optical engineers on staff to support customer designs.
10. How much does it cost me? Do you have budgetary pricing?
    a. To luminaire makers the ChromaLit system offers significant value. Significant inventory reductions of LEDs are made possible. Elimination of diffuser, heat sink and LED components from the efficacy creation add up to tens of dollars per luminaire. We believe our pricing offers significant opportunities for luminaire makers to grow their solid state lighting business with higher value products for their customers while streamlining their operations. To obtain a quotation for ChromaLit please contact our partner, DigiKey www.digikey.com
11. How are ChromaLit products made?
    a. Intematix's manufacturing techniques are proprietary and not disclosed to outside parties but in general, ChromaLit products are made by bonding a phosphor/polymer composite to the substrate with a precision process.

12. Where are ChromaLit products made?
    a. The production facility for ChromaLit products is located in Fremont, CA at Intematix company headquarters.
13. How are ChromaLit products binned?

   a. ChromaLit bins are centered on the black body curve which is a significant advantage over white LEDs that are binned in quadrants about the curve. The color range of the bin is 3 standard deviations (SDCM) which is significantly more consistent than ANSI recommendations. Narrower selections are possible for additional charges.

14. What specification of blue LED do I need? Is there an optimal wavelength?
   a. The most important design consideration for the blue LED energy supply is its consistency (average of all the LEDs in the array) about a dominant wavelength. Shifts of 2nm result in additional color shift of 1 SDCM at the white light output. For optimal overall system performance the dominant wavelength of 455nm is recommended. LEDs of this type are supplied by many manufacturers in a range of sizes and output levels.
15. Are you working with LED manufacturers? Do they support ChromaLit designs?
   a. Intematix is working with all the major producers of LED components and they are allied with the ChromaLit commercialization plan. ChromaLit introduction has created large new market opportunities for LEDs in the deep blue wavelengths.
16. Can I get other shapes or sizes? Can I customize with ChromaLit?
   a. Yes, the ability to customize ChromaLit and offer design freedom to luminaire makers is one of the great benefits of this technology. The procedure for developing a product is for the customer to formulate a specification and RFP that Intematix will return with a proposal for NRE, pricing and minimum order quantities (MOQ).
17. What colors are available with ChromaLit?
   a. The central element to Intematix' competitive advantage is that we can make any color of phosphor emission. For the applications currently under consideration, white CCT ranges from 2700K to 5000K are available. Important signal colors like red, green and yellow are also possible for sign, beacon and vehicle applications.
18. How high a CRI can be made from ChromaLit
   a. Special formulations of phosphor may be implemented to produce CRI of 98 with some trade-off in efficacy. Our standard products go up to 90 CRI.
19. Why is Intematix positioned best relative to other companies to supply ChromaLit type products?
   a. Intematix ChromaLit offers the broadest range of colors and the best performance phosphor of any supplier. While some phosphor makers are strong in a specific formulation or part of the color spectrum, Intematix is unmatched in the range of colors possible for lighting. This strength then leads to offerings of ChromaLit with the most choice, highest CRI, efficacy and light quality.

20. Other lighting companies have launched remote phosphor, system level lighting products in the past. Are there intellectual property (IP) considerations in this area?
   a. Intematix's ChromaLit products use cutting edge Intematix materials and manufacturing technology to deliver superior components for today's lighting industry. The

unsurpassed performance of Intematix's ChromaLit products results from years of research and development and is protected by Intematix's intellectual property.

Additionally, with respect to our ChromaLit products, we have searched and conducted an investigation of US patents related to remote phosphor technology and have found none to be infringed by our ChromaLit products. More specifically, we are not aware of any valid patent claims that would be infringed by Intematix's ChromaLit Round, Square, Linear or Panel product lines. Moreover, we are not aware of any valid patent claims that would be infringed by our Core, Sphere or Candle product lines. Also, we believe that the application of these ChromaLit products in down light, linear light and light bulb applications also do not infringe any valid patent claims.

Please understand that we are not in a position to offer legal advice. We suggest you consult with your attorney for legal advice with respect to your specific application.

Because we are confident that Intematix' ChromaLit products do not infringe any competitor's patents, Intematix will defend and settle any claim brought by a third party against your company alleging that Intematix's ChromaLit products infringe any valid patent claims, subject to our general Terms and Conditions for product sales.

21. Are the materials used in ChromaLit sources environmentally compliant and safe?
    a. Yes, all materials used in ChromaLit sources meet RoHS requirements for environmental and human safety.
22. Can ChromaLit products be used outdoors?
    a. Yes, ChromaLit sources offer the same benefits to outdoor lighting and indoor lighting. The polycarbonate and glass substrates used are high temperature and UV resistant to the requirements of typical outdoor applications
23. Can the yellow/gold external appearance of ChromaLit be reduced or eliminated?
    a. Yes the intrinsic coloration of the ChromaLit source may be masked by diffusing, refractive or reflective optics. Some of these approaches may have a trade-off in efficacy however. It is worth noting that the color is not visible when the system is turned on and many applications are only visible during on time. As with most features, ChromaLit offers considerable design freedom in this area. This option would be custom however.
24. At what level of operation does ChromaLit saturate?
    a. While a precise saturation level has not been determined it is very high, much higher than typical lighting designs. ChromaLit technology has been implemented in specialty lighting applications where the radiant incidence of blue light energy exceeds $10W/mm^2$.

25. What is the conversion factor between blue lumens in to white lumens out?
    a. Royal blue LEDs typically have a conversion efficiency of about 40% to 55%. This means they are converting about half of the electrical power to blue light. Using our

conversion efficacy data on the ChromaLit, you can simply multiply the LED efficiency by the ChromaLit conversion efficacy to get the lumens per Watt measurement.

So assuming you have a 50% Blue LED here are the following measurements for our product:

CCT (K)	CRI	Typical Conversion Efficacy (lm/Wrad) at 25C	Lumens/Watt
2700	90	180	90
3000	80	200	100
3500	80	205	102.5
4000	80	210	105
5000	70	230	115

Remember this is the Lumens per Watt of the system not including losses from the AC-DC power conversion or optical losses. You do not need a diffuser with ChromaLit.

26. How does temperature affect the performance of the Phosphor?
    a. From about 25C to 90C the efficacy typically goes down by about 5 lm/Watt rad.
27. Is there a maximum lumen throughput of the phosphor plate does it droop / saturate when loaded heavily?
    a. Please refer to question 26, regarding light conversion saturation. Maximum lumen throughput will most likely be limited based on the maximum operating temperature specified for ChromaLit, which is currently specified at 95°C. A general rule of thumb under this specification is approximately 240 lumens per square inch maximum throughput. Design safety factors should always be applied. Our datasheet and product selector guide provide guidelines on recommended lumen output based on our product dimensions.
28. Are there fluctuations in colour point through life?
    a. Very minimal at this point. We have completed 6000 hours of testing, and seeing less than .001 in the x and y direction.
29. Are the light output depreciation values based on LED values?
    a. Right now our current testing includes the depreciation of the LED as well as our ChromaLit product.
30. Can you apply the phosphor to substrates other than polycarbonate?
    a. Yes, but it is still in the R&D phase.

31. Can you coat my 3D optic?
    a. We use molding processes but we cannot coat a 3D object at this time. Also, the phosphor cavity will alter current light paths from existing optics, which are designed to work with LED point sources.

32. What type of LEDs should I use?
    a. Any "Royal Blue" LED is within our optimal wavelength for ChromaLit. (450-460nm) but any blue LEDs will work. ChromaLit specifications are based on 455nm average dominant wavelength.
    b. Lumileds: recommend ordering code for best performance: LXML-PR02-1100
    c. Osram: ordering code for best performance: LD W5AM-3T4U-35
    d. Cree: recommend ordering code for best performance: XPEROY-L1-0000-00B02
    e. ITC: C1109D
33. Can we thermo-conform your product?
    a. No, thermo-conforming causes the phosphor to crack and become deformed leading to an uneven distribution of light.
34. Do you have output and efficiency data for the samples you produced in the Demo Kit?

Input power ($W_{electrical}$)	Radiant Flux (W_{rad})	Efficiency of Blue LED ($W_{rad}/W_{electrical}$)
13W	5.3W	40%

CCT	Input Power	Flux	CRI	Conversion Efficacy (Lm/W_{rad})	System Efficacy (Lm/W)
3000K	13W	1000lm	80	200	80
4000K	13W	1100lm	80	210	85

35. Are you LM80 certified?
    a. LM 80 governs LEDs and LED modules so ChromaLit as a component may not be LM80 certified under the current spec Thus designers of ChromaLit systems must be tested at the fixture or modular level. We are currently running our own reliability test (data reflected in the data sheet that you have) and the performance maintenance is on track to exceed 94% for lifetime (better than Energy Star standards). Thus, when a ChromaLit system is designed with an LED that meets LM80 it will have high reliability. Royal Blue LEDs are currently testing to LM80 specifications and Intematix is currently working with an Energy Star certified laboratory to define detailed test requirements and test methods required to define an LM80 equivalent IES standard. Once established, this testing protocol along with existing life test data will be reviewed with IES. Assuming buy-in of the test protocol by the chairman of the IES committee, a draft for a new IES standard will be presented at the annual IES meeting in October.

36. What is your RA data?
    a. For 2700K, 90CRI ChromaLit:

Ra	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
90.3	91.6	91.9	89.4	91.0	89.0	86.7	94.5	88.2	70.4	78.3	88.6	65.3	91.2	93.5	90.7

    b. For 3000K, 80CRI ChromaLit:

Ra	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
80.0	78.0	86.6	93.4	77.1	76.3	80.3	85.6	62.5	11.3	67.8	72.4	53.8	79.5	96.3	73.0

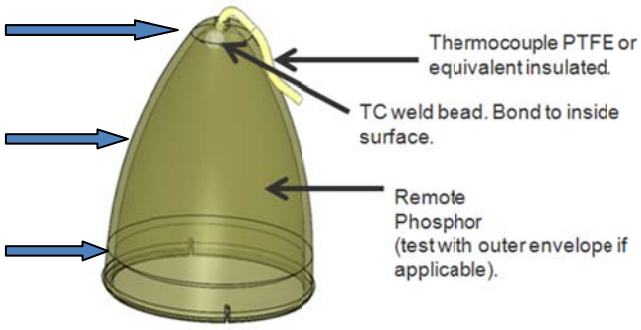
37. Is it possible to add a formulation of something that increases significantly the red rendering but keeps the efficiency up? Can R9 (or other measure) be maximized simply?
    a. The only way to increase R9 is to add some red content to the phosphor mix and, unfortunately, the red phosphor is inherently less efficient than blue, green and yellow phosphors (meaning the physics of the way your eye works and the conversion shift of light). The more you add, the higher your R9, but the lower your efficacy/efficiency of the light conversion. Since this is a physical reality, everyone in the world is facing the same issue. So the same systems with a higher R9 will always have a lower efficiency. But we are working hard to close that gap as much as possible!
38. What is Intematix's current statement on the lumen maintenance?
    a. We have tested for about 6000 hours but using that data to predict performance at 50,000 hours, we are on track to have slightly better than 85% lumen maintenance. This is also including the degradation of the LEDs. Our specification indicates L70 (70% lumen maintenance at 50,000 hours.)
39. What happens to the output from your remote phosphor if to support large orders we end up using Royal blue color in 3 color bins including: 3 (440-445nm), 4 (445-450nm) and 5 (450-455nm) and nothing in 6 (455-460nm).
    a. Lumileds rates in peak wavelength instead of dominant (which is about 5nm higher) this is not far off of the average wavelength we tune to, 455nm. If you were to evenly mix all the bins the average dominant wavelength would be 452.5. For ChromaLit, this is the better option since the LED wavelength tends to shift up with increase in junction temperature. For other Royal Blue LED brands, rated in dominant wave length, using bins 4 (445-450nm) and 5 (450-455nm) and 6 (455-460nm) is recommended.
40. I am seeing a color shift of about 800K cooler than the specified color temperature, why is this?
    a. This is caused by inadequate reflectivity in the mixing chamber. If the mixing chamber surfaces are not covered in a highly reflective material then white light, that has already been converted but bounced back toward the LED, does not get recycled and is lost.
41. Do you meet energy star?
    a. We do meet the requirements for Energy Star, however LM 80 testing currently has to be done at the fixture level.

42. Can I bend ChromaLit?
    a. It could be a bit difficult to get ChromaLit made into a slightly convex or concave shape, as there is some concern with bending the 2.1mm thick material. The potential issue is undue stress on the plastic/phosphor film interface from mechanical deformation and possible effects within each layer. As you bend the substrate it will also deform the phosphor making it thinner in some areas and thicker in others. This could potentially cause a color shift throughout the substrate.
43. How about rolling ChromaLit into a cylinder, would a thinner substrate help?
    a. Cylindrical deformations are the easiest to create but can be challenging as the material thickness is 2.1mm. Changing to thinner materials will mean a loss of efficacy, since our current substrate has been optimized for efficacy. A slight reformulation may be necessary on a thinner substrate to try and compensate for this and will include an NRE charge and MOQ.
44. Is there a CRI shift with a change in LED intensity?
    a. No.
45. Are there UL tests or guidelines for remote phosphor?
    a. UL approval is not required at the component level.
46. What should I know about UL requirements and using ChromaLit (polycarbonate)?
    a. UL1598 and UL8750 are Luminaire Designs and Safety standards.
    b. UL94 specifies polycarbonate flammability ratings (thickness should accompany UL rating).
    c. Flammability ratings are not required for class2 or low voltage/limited energy designs.
    d. ChromaLit on ploycarbonate is UL94-V2 at 2.1mm nominal thickness.
    e. Flammability rating of UL94-5VA is required for non-class 2 and direct connect units (most stringent flammability rating).
    f. Non-class2 and direct connect units rated for wet conditions requires UV rating per UL746C.
47. What is a damp location?
    a. An exterior or interior location that is normally or periodically subject to condensation of moisture in, on, or adjacent to, electrical equipment, and includes partially protected locations.
48. What is a wet location?
    a. A location in which water can drip, plash, or flow on or against electrical equipment.
49. What is a dry location?
    a. A location not normally subject to dampness, but may include a location subject to temporary dampness, as in the case of a building under construction, provided ventilation is adequate to prevent an accumulation of moisture.
50. In the case of remote phosphor breakage is blue light a safety concern ?
    a. It is not a hazard. The blue LED is in the same lighting case/radiation class as white LEDs.
    b. Our part can withstand a 3’ drop on its own, however, the attachment to the fixture (whether adhesion, or snap-on interference fit) need to be drop tested.

51. What are the UL considerations for the 360 ChromaLit parts ?
    a. As discussed with the 2D ChromaLit, the polycarbonate material has a flammability rating of V2. Therefore, for non class 2 systems, an outer envelope with higher flame rating is required.
    b. The 360 ChromaLit material is designed for rugged long term reliable operation when exposed to continuous LED blue flux. However, high levels of solar radiation, specifically in the UV portion can cause degradation of the material. The 360 ChromaLit is not UV f1 rated, so full outdoor solar exposure is not recommended.

52. How should I handle the 360 ChromaLit parts.
    a. Although the parts can be handled with unprotected clean hands, the parts are best handled with clean cotton gloves or finger cots to prevent and exposure to contaminants.
    b. If the parts do show signs of and surface contamination, a lint free cloth dampened with mild soap and water or isopropyl alcohol can be used to clean the surface.
    c. Denatured alcohols (methyl, isobutyl, etc…) are Ok.
    d. AVOID - Acetone, toluene, dichloromethane, thinners, gasolines.

53. What is the maximum temperature of the ChromaLit 360 light sources and how do I measure it?
    a. The maximum inside surface temperature of all ChromaLit 360 sources is 110 °C. For the small candle, the top measurement is made anywhere in an annulus ½ to 1 mm down from the top vertex point.
54. How do I measure the temperature of the ChromaLit 360 light sources.
    a. Intematix recommends using a 36 gage K-type thermocouple bonded to the inner surface through a small drilled hole. A small quantity of LockTite Epoxy Pak adhesive (or equivalent epoxy rated to 149C or higher service temperature) is used to bond the thermocouple. The temperature measurement technique is described in more detail in the 360 ChromaLit Design Considerations applications note.
    b. Since the application including LED array and PCB mount may impact thermals, it is recommended to measure the top, side and bottom temperatures and verify that the 110 °C maximum temperature is achieved under all operating conditions and with all appropriate cover glass if applicable.



    c. For the small candle, the top measurement is made anywhere in an annulus ½ to 1 mm down from the top vertex point.
    d. For alternate methods please see the Application Note for 3D ChromaLit.

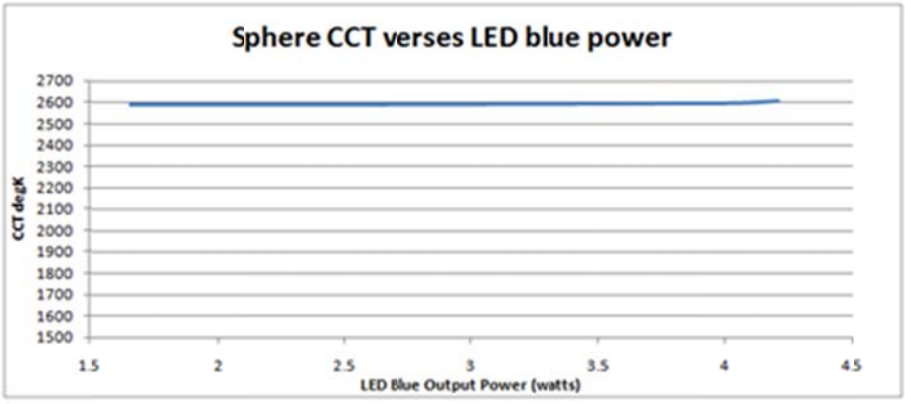
55. What applications are the ChromaLit 360 suitable for.
    a. LED retrofit bulbs
    b. Downlights
    c. Appliances
    d. Wall Sconces
    e. Pendants
    f. Hospitality and decorative applications
    g. Signal and entertainment lighting

56. What are the model number designations for ChromaLit 360 ?

CL-ABC-DEFGH-IJ
Where
CL -- Designates ChromaLit products
A -- Designates first digit in CRI
BC -- Designates the first two digits in CCT
DEF -- Designates shape
- CAN Candle
- ELP Ellipse
- DOM Dome

GH -- Product Identification Number
IJ – Designates material
Example:
CL-830-CAN15-PC represents ChromaLit Candle 15, 80CRI, 3000K CCT, polycarbonate family

57. Does the color temperature change if I dim the LED energy supply. ?
    a. No, the color temperature is stable with dimming. This is an advantage since conventional LEDs do experience some shift due to the reduction in phosphor efficacy over the dimming range due to heating.



58. What are the optical design considerations for directing the blue light energy to ChromaLit?

a. It is recommended that a rotationally symmetric distribution of LEDs be used to ensure far field rotational symmetry.
b. The LED pc board solder mask is generally not an efficient reflector. A material with 98% or higher diffuse reflectance is recommended with maximum operating temperature defined by the application See Intematix Mixing Chamber Application note for further details on materials available.
c. The insertion depth of the LEDs defined by the difference between the bottom of the ChromaLit 360 part and the top of the LEDs should be 4mm or less.
d. The LEDs should have a target dominant wavelength of 455nm at the operating current and temperature of the application. The efficiency of the LED should be in the neighborhood of 50% (blue output power/DC input power).
e. The LED surface itself has large optical absorption so a small surface area discrete LED is generally preferable for high output systems. Minimizing the LED source area and maximizing the reflective surface surrounding the LEDs is the goal.

59. If I want a special shape part is this possible ?
    a. Special shapes and sized will require significant NRE and time. It is highly recommended to use an existing standard design.

60. Is the ChromaLit 360 suitable for spot light applications.
    a. The ChromaLit is a distributed source and is therefore not suitable for all lighting applications requiring a compact bright (low etendue) source such as those requiring a high beam candlepower/small source size. Depending on reflector size and ChromaLit source size the beam control may be suitable.

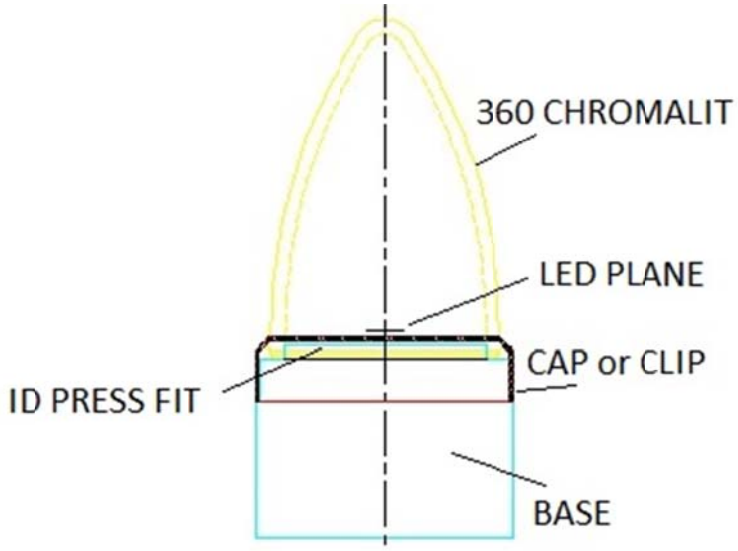
61. What adhesive is recommended for bonding ChromaLit sources ?
    a. As with any adhesive application, the specific operating environmental conditions should be verified as appropriate for the adhesive including minimum and maximum operating temperatures, humidity, shock and vibration as well as spectral flux levels.
    b. 3M DP-460 is a high performance two-part epoxy that is available in off-white. Bond strength data is available for this material to 121C. It provides a flexible bond with high shear and peel strength and should be applied using the 3M automatic dispenser. Although this epoxy is recommended, it should be life tested in the application in which it is intended at the environmental conditions required to verify its suitability. For temporary thermocouple attachment and testing LockTite Epoxy Pak adhesive rated to 149C can be used.

62. What recommendations does Intematix make for optical modeling of remote phosphor, either 2D or 360 ?
    a. Although a very rigorous model can be attempted, this requires proprietary inputs on mean free path, and excitation and absorption spectra of the phosphor mixes used in the remote phosphor. Since this is a complicated system and multiple interaction phenomena between phosphors may not be fully determined, it is recommended to model the remote phosphor as a perfect diffuser with about 50% of the light transmitted and 50% of the

light “reflected”. The reflected light in reality is reflected along with down converted and emitted radiation.

b. To look at relative performance of a mixing chamber with regard to throughput, the LED ray files can be used to define the source (either single or multiple LEDs) and then the total luminous flux can be measured and compared. Color over angle will not we simulated using the simple model, however, the ChromaLit is designed in such a way as to provide industry leading color over angle characterstics.
c. For the 360 products, the IGES file defining the remote phosphor source can be provided. The mixing chamber material can also be modeled as a perfect diffuser, or specific BRDF may be measured or provided by the mixing chamber material vendor.

63. How do I attach the 360 Chromalit in my light source ?
    a. The 360 ChromaLit has an internal diameter that can be press fitted onto approximately 1-1.5mm high cylindrical feature that has the same diameter as the 360 ChromaLit’s inner diameter. Although this generally provides a snug fit, a secondary outer diameter hold is recommended to prevent the part from lifting under high levels of shock and vibration.
    b. All of the 360 ChromaLit parts have either a small radiused feature or flat flange feature at the bottom outside surface that can be used to hold the part.
    c. A cap or clip can be used as shown in the diagram below. The diagram below shows both an ID press fit along with a bottom feature hold. In some cases the inner diameter may be eliminated and only the outer part is necessary to hold the remote phosphor source.
    d. Any design should be shock and vibration tested under operating temperatures which include thermal expansion of all components.



64. What type of light distribution can I expect from 360 ChromaLit parts.
    a. In general all surfaces of the 360 ChromaLit are uniform Lambertian radiation sources. The shape will still determine the typical far field patterns. A part with low height and large diameter will typically provide more radiation upwards, conversely, a part with smaller diameter and larger height will provide more side emission.
    b. To achieve a downward emitting distribution an external diffuse globe may be required. Specifically, for an Energy Star A19 distribution an outer diffuse envelope in the shape of an A19 (spherical with waist is generally necessary).
    c. Please the typical far field light output distributions for the 360 ChromaLit parts in the Intematix data sheet.

65. How many lumens can I get from the 360 ChromaLit ?
    a. Each 360 ChromaLit part has a recommended lumen range based on its shape and size. For designs that incorporate an outer envelope in which the 360 ChromaLit is full surrounded by, the temperature of the part will be higher for the same LED blue power incident upon it.
    b. It is highly recommended to measure the maximum operating temperature of the 360 ChromaLit at the maximum blue power (maximum lumens), to verify the part is operating under the 110C maximum at any point under all environmental conditions (such as ambient temperature and maximum power levels).