AGA Takes Position Urging Changes in Diamond Color-Grading Procedures Following Research Showing Grades for Fluorescent Diamonds May Mislead Consumers

In light of scientific data that shows there are insufficient UV emissions in most indoor lighting environments—including those using daylight-type fluorescent lighting—to excite a color reaction in fluorescent diamonds that is comparable to what is seen when the color is graded within a few inches of a UV-emitting light source, *the AGA contends that the use of UV emitting light to color-grade diamonds rather than lighting which is devoid of UV emissions results in grades for fluorescent diamonds that distort the representation of quality and value and which do not represent the color typically seen in today's real world.*

The AGA contends that in the case of fluorescent diamonds, scientific data shows that color grades based on the color seen when holding a diamond within a couple of inches of an unfiltered, UV-emitting light source is not the same color the diamond will appear when moved a short distance away from the light, and the farther away from the light, the greater the color difference (See Supporting Documentation from the Literature in Appendix). The color exhibited *within a few inches* of a UV-emitting light source is a color that will *only* be seen when held at such close distance, or when viewed outdoors, in natural daylight. Since many people today spend most of their time in indoor environments, and since the color grade indicated on most lab reports for fluorescent diamonds does not represent what people will see when viewed anywhere except in outdoor daylight environments, *the AGA contends that the grade now shown on most lab reports for fluorescent diamonds misrepresents the color.*

Furthermore, the AGA notes that the actual procedure currently used by major diamond grading laboratories to color-grade diamonds is scientifically unsound. Current procedure requires that "master stones" be *non-fluorescing* and the light source must be a daylight-type fluorescent light that produces *unfiltered fluorescent light containing UV emissions that will excite the fluorescent reaction of any fluorescent diamond being graded.* The color of any non-fluorescing master-stone will not be impacted by UV emission coming from an unfiltered fluorescent bulb, while the color of any fluorescent diamond ***is*** impacted by the UV emission. To make a fair comparison, the color-grading of any fluorescent diamond against a non-fluorescing master-stone would require making the comparison when the fluorescent diamond is in its "steady state" rather than its "excited state" (the "excited" state is when its fluorescent reaction is triggered by the UV emission from the unfiltered fluorescent bulb); a fluorescent diamond's "steady" state would be its "inherent body color" and *not* the color it *appears only when it is fluorescing*. *The AGA contends that to compare a non-fluorescing "master stone" against a diamond in which the color has been temporarily altered as a result of the excitation of its fluorescence triggered by the mandated light source is contrary to good scientific procedure.* To grade in this way provides an inappropriate comparison resulting in a grade that does not represent the color the diamond will show in its "steady" state, which is the state most frequently observed except when viewed in outdoor daylight.

Furthermore, scientific data confirms that the color shown by a fluorescent diamond in outdoor daylight is not a constant color because UV emissions in outdoor daylight vary dramatically depending upon many factors (see Appendices D-F). Therefore the color grade now assigned by laboratories, using current procedures, does not even represent a constant color that will be seen in outdoor daylight. *Therefore, the AGA contends that the best way to ensure consistent color-grading and to avoid dramatic color inconsistencies due to the variables found in UV emissions, both indoors and outdoors, is to use lighting devoid of UV so that the color grade reflects its most consistent color: the stone's "steady" color (its inherent body color).*

The AGA further contends that while the color of any diamond, fluorescent or non-fluorescent, can be affected by the wavelengths of light in which it is seen, only fluorescent diamonds may exhibit a color significantly different from its inherent body color, depending upon the strength of its fluorescence, and the particular wavelengths of light in which it is viewed. *Therefore, the AGA contends that diamond grading reports would better communicate, and more honestly represent the unique character of a fluorescent diamond, by providing either two color grades that would show the range of color that may be seen in the particular stone—1) the stone's "steady" color (its" inherent body color") seen in lighting devoid of UV emissions, and 2) the "excited" color seen when graded with UV-emitting lighting for which a precise standard has been defined—or a comment on the report indicating that the color of the stone may appear whiter/less white when viewed in outdoor daylight.*

Finally, the AGA contends that to continue to grade fluorescent diamonds as they are currently graded results in a situation whereby the interests of the buyer as it relates to value are not being honestly served. In the case of fluorescent diamonds, the color grades now shown on diamond grading reports issued by labs using a UV-emitting light source indicate the color the stone *appears* in its "excited" state and can be several grades higher than the stone's inherent body color (the actual color that will be seen in any light except outdoor daylight, or when held deliberately close to a UV-emitting light source). *The AGA contends that such diamonds are priced higher (and in some cases, much higher) than prices would be if grades reflected a stone's inherent body color—the color normally seen—and that even when "discounts for fluorescence" are factored into the pricing, prices may still be significantly inflated.*

SCIENTIFIC FINDINGS SUPPORT THE AGA POSITION

After reviewing extensive scientific data published by the *International Commission on Illumination (CIE), National Institute of Lighting Technology, Physics Laboratory, Optical Technology Division (NIST), National Lighting Products Information Program (NLPIP), Pacific University College of Optometry, Georgia State University Department of Physics and Astronomy, the United States Department of Energy,* and other resources, and articles appearing in the archives of *Gems & Gemology* and *JCK*, and following research by AGA members themselves after presentations given at their conference in Tucson, in February, 2008, the AGA has concluded that diamond grading laboratories should change current procedures for color-grading fluorescent diamonds and eliminate the use of light sources containing UV emissions or filter out UV wavelengths from the light source being used.

In addition to eliminating UV emission from light sources used to grade diamonds, the AGA also recommends that the trade establish and publish more precise standards for the lighting conditions under which diamonds and colored gemstones are graded, including precise distance from light source, and initiate procedures to provide for periodic calibration of lighting units to insure consistency in output (since the actual output changes over time), without which there cannot be compliance with established standards. Without establishing more precise lighting standards related to the many factors affecting the lighting under which diamonds are graded, and the reaction of diamonds to those factors, inconsistency in color grades will continue between laboratories.

SUPPORTING FACTS

1. The premise that in "the real world" there are UV emissions present in indoor lighting, at typical "people distance" (judged at 4 feet and over) from a UV emission source such as a fluorescent light bulb, that are strong enough to excite a diamond's fluorescent reaction, is scientifically invalid. The principles of physics related to distance as proven by Sir Isaac Newton are as valid today as ever: *the intensity of UV wavelengths decreases as distance increases.* Recent research by the Dazor Engineering Lab and by AGA members using UV meters in a variety of lighting conditions confirmed the validity of these laws as they apply to color-grading diamonds (See Appendices A & B).

   Current procedures used by laboratories for color-grading diamonds ignore principles of physics – and their impact on UV emissions. As the distance from a source (such as a fluorescent bulb) increases, the intensity of emitted wavelengths decreases. Because the UV component is smaller than the visible spectrum emitted by indoor light sources, the UV "dies out" with distance at a rate similar to but somewhat less than that from a point light source. Therefore, the inverse square law applies but is not exact. The net result is that in the case of UV wavelengths, there is virtually no measurable UV present indoors, in areas lighted by fluorescent lighting.

   Contrary to what gemologists have been taught in recent years, and contrary to the rationale supporting current practice, the principles of physics related to distance, as demonstrated in charts A & B in the Appendix, demonstrate that there is no measurable UV emission in indoor lighting, even in natural daylight coming into indoor environments through a window or skylight or other means.

   Thus, *grading a fluorescent diamond at the source of the UV emissions creates a contrived environment in which a fluorescent diamond will exhibit a color that will* ***only*** *be seen outdoors, during daylight hours.*

2. Data show that UV emissions are present in indoor lighting as well as in natural outdoor daylight, but in the case of indoor lighting UV emissions are present in measurable intensity ONLY at a point very close to the actual source. The impact of the distance from any light source that emits UV on the actual radiation levels present is dramatic. When only 12 inches away, the presence of measurable UV emission drops sharply, and after several feet it is **50-100** times less than at a distance of 2-4 inches from the light source. Thus, logically, to grade any fluorescent diamond at a distance of only a couple inches from the light source, where UV exposure is so strong, will cause the diamond to exhibit a color that will be different from what it would be if graded only a few more inches away, and very different from what it will be at a distance of a few feet. (See Appendix B)

   Because of physical law we know that in any indoor lighting environment, as the distance from the light source increases, the intensity of its wavelengths decreases. In the case of UV wavelengths, there is insufficient UV present, or any wavelength of light, to trigger a fluorescent reaction comparable to what has been seen when graded within a few inches of the light (See Appendices A & B). When viewed at typical "people" distance (4 feet or more) from an indoor light source, the color seen will *not* be the color assigned by a grader who is judging the stone at a distance of a few inches from a UV-emitting light because at such close proximity to the source, the wavelengths with "excite" a much stronger fluorescent reaction than elsewhere in the room. The color that will be seen at normal "people distance" from the light source will be the stone's "steady" or inherent body color.

   The impact of basic principles of physics on UV emissions explains why there is no measurable UV emission indoors, but it also ***underscores why it may now be considered a deceptive practice to color-grade fluorescent diamonds at a distance of only a few inches from a UV-emitting light source, where exposure to UV-emissions will be so much stronger than anything that will ever be found indoors at distances greater than a few inches from the light source.***

3. As a result of distance, depending upon the strength of a stone's fluorescent reaction, the color-grade assigned by a grader holding a diamond several inches from an unfiltered daylight fluorescent bulb of the type now used in most diamond-testing laboratories may differ from grade assigned to the stone by someone else grading it at a greater distance from the light source, even just a few inches farther away. This means that the color-grade given by one grader may differ not only from that assigned by another grader holding the diamond at a different distance from the light, but also from the grade assigned by the same grader judging the same stone subsequently but holding it at a different distance from the light source.

   When grading fluorescent diamonds, the color of the *same* diamond will appear different when the strength of the fluorescent reaction is weakened as it moves farther and farther away from the light source. When a diamond is held closest to the light source, where the UV emission is so much stronger than even a few inches farther away from the source, its strongest fluorescent reaction will be triggered. As it moves farther away from the source, the intensity of the fluorescent color will be weaker and its apparent color will be altered. ***Using unfiltered daylight, without exacting standards for distance from the source, will result in inconsistent grades for fluorescent diamonds, even the same diamond held at a different distance from the source.***

4. Since the most common fluorescent color seen in diamonds is blue, the closer the diamond is held to the light source, the *whiter* the color will appear. As it is moved farther and farther from the light, and the fluorescent reaction diminishes more and more, at only a few feet away it will reveal its inherent body color, that is, the color seen when the diamond's fluorescence is no longer excited (when in its "steady" state). So the farther away the diamond is from the light source, the closer the color will be to its inherent body color. This is the color – the inherent body color – that will normally be seen indoors, or at night. Depending upon the strength of its fluorescence, and distance from a UV-emitting light source, a diamond that fluoresces blue could be graded as many as 4 grades whiter than it will *ever* appear indoors. Thus, the color grade will not be representative of the color that will be seen in most environments.

   To color-grade diamonds based on what is seen under UV-emitting fluorescent bulbs at a distance whereby the UV emission is 50-100 times stronger than it will be in any other environment except outdoor daylight, creates a lighting environment that provides a grade that is not representative of the stone's color seen in most environments.

5. The pioneers who founded our most prestigious gemological organizations were aware of these principles and developed color-grading procedures that reflected them. In their 1969 Diamond course, GIA instructed diamond graders to use UV-filtered lighting in order to judge the inherent body color, as did Eric Bruton in his classic work, *Diamonds*, published in the 1970s and reflecting the policy of the British gemological association at that time.

   This policy seems to have undergone a change as daylight-type fluorescent lighting entered homes and businesses. Possibly it was a result of inadequate understanding of the principles of distance and absorption, resulting in a belief that there were sufficient UV emissions anywhere in a room to excite a fluorescent reaction indoors. Evidence of this flawed rationale was found in various jewelry trade magazines, such as an article in a 1998 issue of JCK, in which John King, then director of special projects at GIA's Gem Trade Lab, explains, "Yes, you can create an environment devoid of UV, but it's a false situation.…It may sound like the ideal, but it steps outside the practical world. It's not relevant because it doesn't really exist anywhere. We try to be sensitive to the practical gemological issues."

   Knowing what we now know, and the error of the logic behind changing grading procedures to use a UV-emitting light source, the industry must now correct the error, and follow the wisdom of its fathers.

6. With regard to outdoor lighting conditions during daylight hours, the intensity of UV emissions in outdoor lighting varies depending upon time of day, the part of the world in which one lives, the altitude at which one lives, and other variables. Thus, whatever color a fluorescent diamond might appear when viewed outdoors, that color will not be constant, but will change as conditions change. In short, the grade assigned is not a *constant* grade. (See Appendices C, D, & E)

SUMMARY AND CONCLUSIONS

- When the principles of distance and absorption related to lighting and UV emission are properly understood, it becomes clear that as the distance from a UV-emitting light source increases, or from *any* type of indoor lighting, there are insufficient wavelengths to trigger a fluorescent reaction resulting in a color that is comparable to what is seen when graded within inches of the light source. Thus, depending upon the strength of the fluorescent reaction, and the exact distance from the light source*, the color seen in fluorescent diamonds in any indoor lighting environment is a color that is different, often very different, from what is seen when held within inches from the source.*

- Many people today spend most of their time indoors, at home or at work. Therefore, since a fluorescent reaction will not be triggered in indoor lighting environments of any type when at people distance from the source, the color *most often seen* in any fluorescent diamond will be its *inherent body color* (that is, the color seen in the stone's "steady" state—when there is no fluorescent reaction).

- The only type of lighting in which a diamond's fluorescence will be triggered sufficiently to result in a color that is comparable to what is seen when a fluorescent diamond is held within a few inches of a UV-emitting light source is *outdoors* during daylight, or when the diamond is viewed at purposefully short distances from an unfiltered UV emission source (such as the fluorescent light bulb commonly installed in diamond grading lighting units used in most major laboratories today).

- Outdoor daylight conditions are variable and cannot be quantified for diamond color-grading purposes due to the effects of the variables such as where one lives, time of day, altitude, smog and so on. Therefore, while fluorescent diamonds are sometimes seen in outdoor daylight, *the color seen in outdoor daylight is variable*. There is no such thing as a single set of wavelengths that can be described and quantified as "outdoor daylight." *The inherent body color is, therefore, the only color that can be consistently and reliably graded, using a light source devoid of UV emissions.*

- For those wearing exceptionally large and important diamonds that are worn most often at night, in artificial lighting environments devoid of any UV, the color seen will be the inherent body color.

Based on the physics of distance impacting light intensity, color-grades now given for fluorescent diamonds indicate a color that is not representative of the stone's "steady" or "inherent body color," nor is the grade representative of the color the diamond will appear in most environments in which it will be seen or worn. **Therefore, it is the conclusion of the AGA that the only way to 1) consistently color-grade any fluorescent diamond, 2) provide a grade that represents the color that will normally be seen where diamonds are most often worn, and 3) ensure appropriate valuation of these diamonds, is to grade fluorescent diamonds in their "steady" state, the color the diamond exhibits when it is not fluorescing (its *inherent body color)*. In order to grade a fluorescent diamond in its steady state, the grader must *use a light source in which no UV emission is present*.**

In an effort to clearly, completely, and honestly grade and describe the color of any fluorescent diamond, the AGA recommends that laboratories consider providing *two* (2) color grades on reports, with language that explains in consumer friendly terms the unique properties of the particular stone's color behavior.

In addition to all of the above considerations, the AGA wants to stress that the scientific community within the gemological field has a responsibility to define and specify basic illumination standards and measurement procedures in the diamond grading laboratory environment. As part of this task, it should be noted that, while weaker than what is seen when held directly beneath a UV-emitting fluorescent light, some more limited degree of blue fluorescence may also be excited within the visible light spectrum, at near-UV wavelengths above 400nm, with the excitation diminishing after 415nm. While the impact of distance cannot be ignored, and blue-fluorescent diamonds won't exhibit the same color at normal "people-distance" from any light source as it will within a few inches of a UV-emitting light source, since fluorescent light sources also emit wavelengths in the visible spectrum with a peak wavelength emission at 405nm, AGA recommends doing *research on the possible benefits of using an LED lighting environment that would eliminate any possible excitation of fluorescence in **any** diamond, at **any** distance* (since peak wavelength emissions found in today's white LEDs are at approximately 450nm and 555nm).

We hope that the scientific data presented in this position paper, and on which it is based, will encourage major laboratories to review current practices as they relate to lighting and its impact on color grading. **After reviewing the findings presented here, we also hope that laboratories will agree that it is imperative to take immediate steps to begin to work together to establish a quantitative definition of approved illumination environments and procedures, and to develop and publish a set of *standards for* –**

- Precise Distance from Light Source for Color Grading Diamonds
- UV Content allowable in Light Source
- Approved Illumination Technologies
- Approved Correlated Color Temperature for Diamond Grading
- Requirement for Periodic Calibration of Illumination Source
- Requirement for Certification of Illumination Source against defined Standards

In closing, let us keep the issues in perspective and the words of GIA's Founding Father, Robert Shipley (from Gems & Gemology, Vol 5, No 9, p 398):

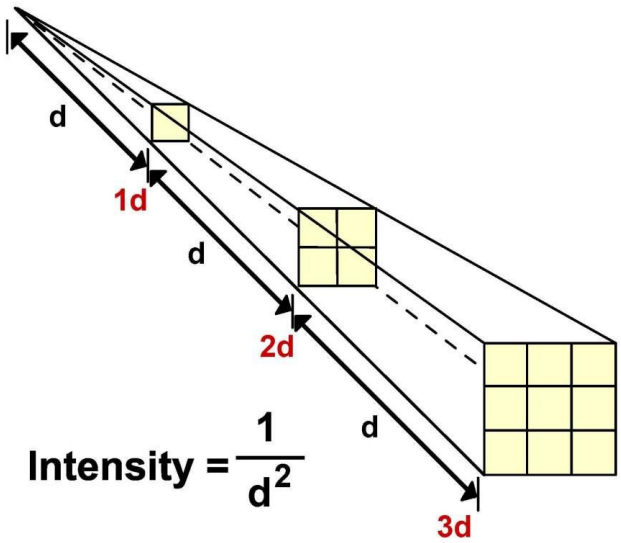
"It is important to stress the fact that fluorescence in diamonds is not a defect or an unfavorable quality. On the contrary, it is distinctly favorable. This is because in a paper of diamonds purchased by a jeweler in artificial light [referring here to lighting without UV emissions present]*, which is a more reliable light for buying diamonds, the bluish fluorescent diamonds are the most desirable, since they are of superior quality in daylight and especially so in sunlight or near sunlight. Similarly, the layman who buys a [bluish] fluorescent diamond obtains one which has the same superior quality, and also a diamond which has a distinctive quality not possessed by every diamond."*

As Shipley pointed out, fluorescence is "distinctly favorable." It is conceivable that at some future time, diamonds with blue fluorescence may be more highly sought by consumers and ultimately increase in price over the price of comparable non-fluorescent diamonds with the same inherent body color. In addition, there could be more interest in diamonds that fluoresce other colors such as yellow, as consumers are shown the distinctive quality of fluorescence, and focus on such benefits as the "warmer" color of yellow fluorescent diamonds when seen in outdoor daylight. Verbiage on lab reports that provides a complete picture of the "color character" of fluorescent diamonds, combined with a retailer's ability to romance diamonds as they have been romanced for centuries, could change the way consumers and the trade perceive fluorescent diamonds and result in increased demand and stronger prices. *But these changes must be predicated on scientifically reliable procedures that produce consistent color grades that indicate a diamond's inherent body color.*

The challenge to the gemological community is to implement policies and procedures that fully disclose to buyers exactly what they are buying, and to do so in a way to ensure that they pay an appropriate price for what they are getting. Accurate color grading on laboratory reports is essential if we are to uphold the standards and ethics of the field.

APPENDIX A

LIGHT INTENSITY: SIR ISAAC NEWTON AND INVERSE SQUARE LAW



Any point source which spreads its influence equally in all directions without a limit to its range will obey the inverse square law. This comes from strictly geometrical considerations. The intensity of the influence at any given radius (r) is the source strength divided by the area of the sphere. Being strictly geometric in its origin, the inverse square law applies to diverse physical phenomena such as gravitational forces, electric fields, light, sound, and radiation.

Non Destructive Testing Resource Center, Inverse Square Law

APPENDIX B

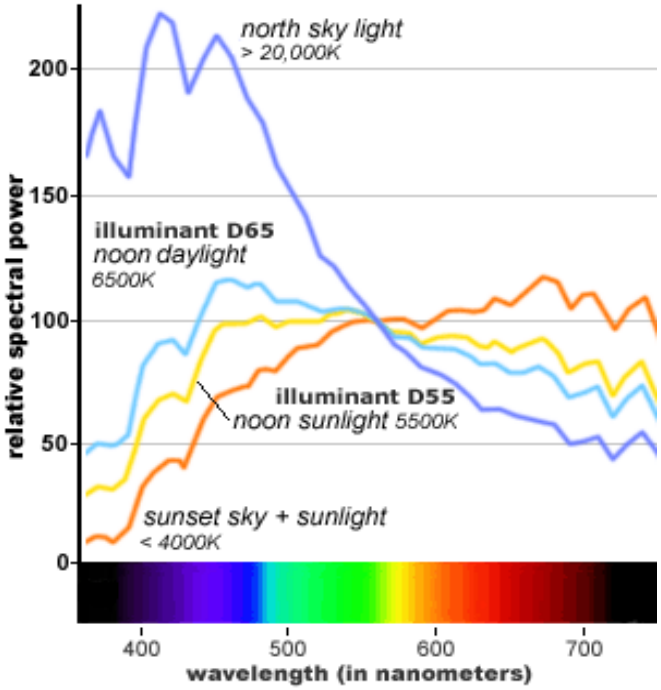
TABLE 2. The five viewing environments used in this study.

				(DAZOR ADDED COLUMNS)		
	1	2	3	4	5	6
No.	Lighting Environment	Light source	Distances: light-to-object/ observer-to-object	light-to object distance	UV at light-to-object distances (μW/cm²) UVX METER	NIST UV A+B
1	DiamondLite, in a darkened room	Verliux type fluorescent tubes (2)	2-4 in./ 12-18 in.	2"	135	175
2	Overhead desk-mounted light, in a lighted room	18" Phillips F15T8/D 15-Watt fluorescent tube	12-18 in. / 6-18 in.	12"	12	19
3	Overhead desk-mounted light, in a darkened room	18" Sylvania F15T8/CW 15-Watt fluorescent tube	12-18 in. / 6-18 in.	12"	14	20
4	Ceiling-mounted room lighting	Phillips FB40CW/6 40-watt fluorescent tubes	Approx. 6 ft. / 6-18 in	6'	0	1
5	Window (indirect sunlight)	South daylight (1:00-4:00pm, July, in New York City)	Not applicable / 6-18 in.	N/A	???	???

Table 2 Columns 1-3: Gems & Gemology, 1997, V33, No. 4, P.251
Columns 4-6: UV Measurements taken in Dazor Engineering Lab
Dazor Presentation AGA Conference – Tucson

APPENDIX C

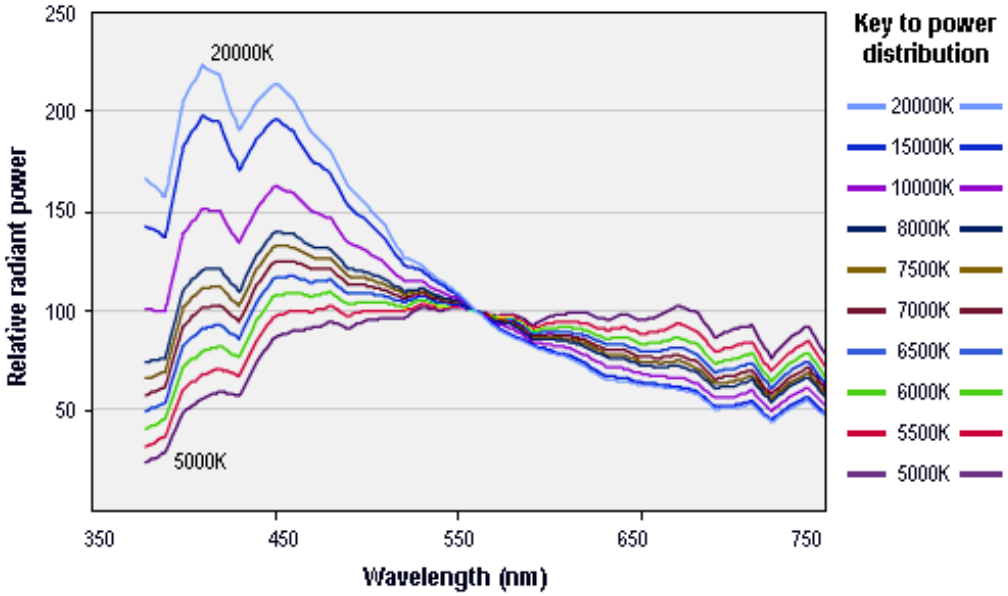
Wyszecki & Stiles, 1982, Spectral Variations in Natural Light



APPENDIX D

National Lighting Product Information Program, Full Spectrum Light Sources

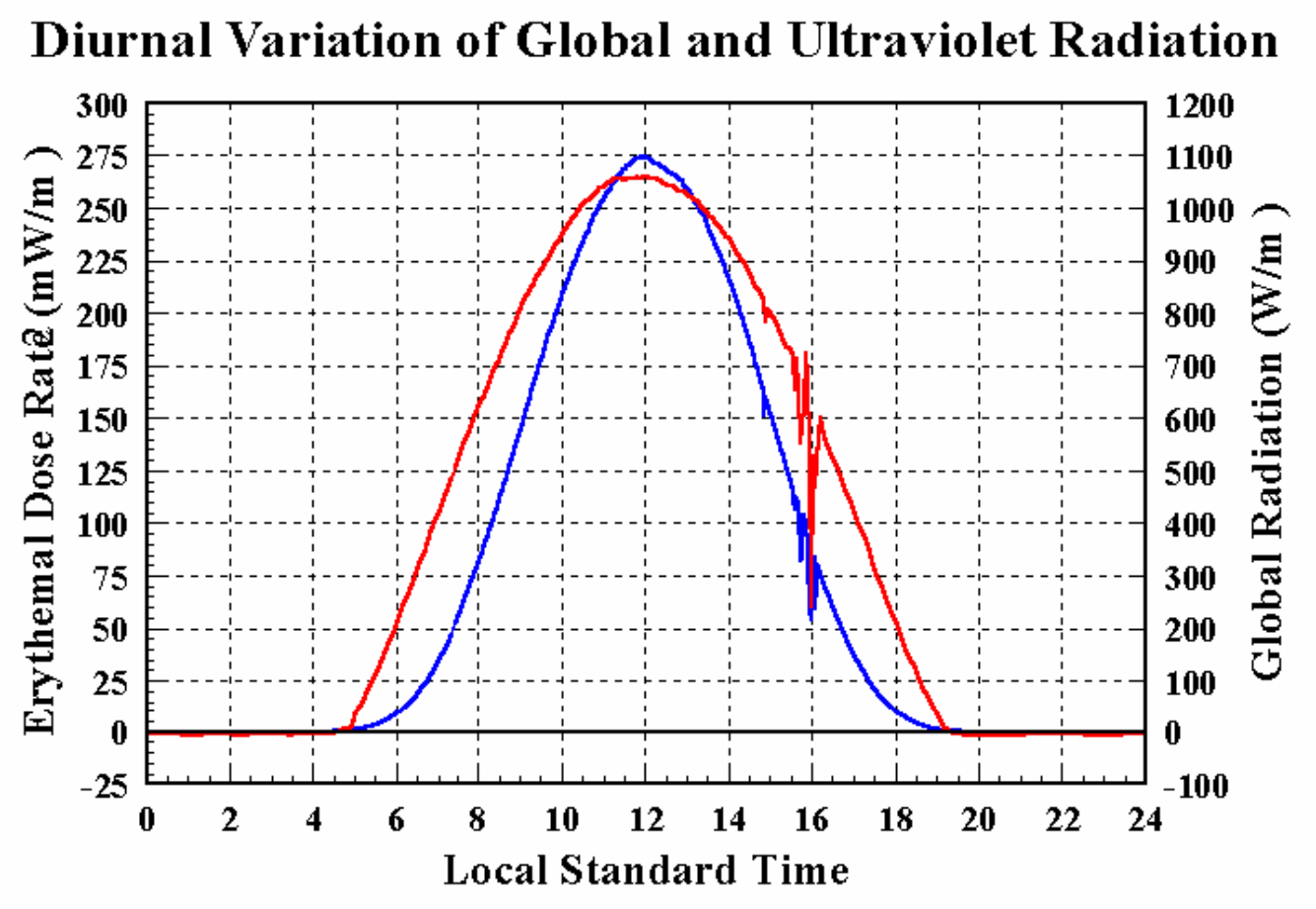
Relative Radiant Power Distribution of 10 different phases of daylight



Standardized CIE relative spectral power distributions for daylight phases across the visible spectrum normalized to equal power at 560 nm, with the correlated color temperature (CCT) of each profile.

APPENDIX E

NOAA / National Weather Service
National Centers for Environmental Predictions



- Clear skies allow 100% transmission of UV radiation to the surface.
- Scattered cloud conditions allow 89% transmission of UV radiation to the surface.
- Broken cloud conditions allow 73% transmission of UV radiation to the surface.
- Overcast cloud conditions allow 32% transmission of UV radiation to the surface.
- People in Northern Europe are accustomed to relatively weak solar UV levels in their countries. However, on their holidays they may also be exposed to stronger solar UV levels at more southern latitudes, reaching maximum levels around the equator. The global solar UV index in the tropical regions around the equator is typically twelve times as high as in the Nordic countries.

SUPPORTING STATEMENTS FROM THE LITERATURE

Professional Gemologist V3 No.1

“We took this film and placed it just below the Verilux tubes in the GIA DiamondLite. Examination of diamonds with varying degrees of blue and yellow fluorescence, with and without the UV-absorbing filter, produced amazing results. A 2.I5-ct. round brilliant with very strong blue (VSB) fluorescence with a color grade of slightly high "H" shifted to a very low "J" when we used the filter (**2-3 color grades**). Another 2.65-ct. oval with VSB fluorescence, shifted from a low "E" to a high "I" with the filter (**4 color grades**). Stones with medium to strong blue fluorescence were affected less (generally a shift of **0.5 grade to 1. 5 grades**).

ACA Gem Lab: *Towards Reconciling Issues of Color Grading Blue Fluorescent Diamonds*

“However, they (GIA) caution "the disadvantage of this kind of illumination is that fluorescent tubes emit a significant percentage of ultra violet radiation. Although this does not affect the grading of non-fluorescent stones, it causes fluorescent diamonds to be **graded higher** then is actually warranted due to the neutralizing, or masking, effect of the fluorescent color on the true body color"

“Gemologists graduating from the GIA in the 1969 time frame came away with the principle that diamonds should be graded for color under a daylight balanced artificial illumination absent the UV radiation energy contained in natural northern daylight and also contained in fluorescent lighting. They learned that grading in daylight or fluorescent light with the attendant UV radiation **will result in over grading a blue fluorescing diamond**. This has become the conventional wisdom among gemologists since that time.

“Eric Bruton's book, *Diamonds*, published in the 70's, indicated that gemologists worldwide shared these views on illumination for diamond color grading. In a section of his book under conditions for color grading, he said a "very important consideration is that any fluorescence in the stone must be suppressed.” "It is therefore important to grade stones in white light that is relatively free of ultra-violet."

“Most importantly, fluorescent illumination containing significant UV energy certainly does not reveal the "true color" as defined by the early gemologists and as understood by the trade. In addition, the amount of UV exciting the fluorescence in the diamond being graded varies with the tube's manufacturer, with the tube's age and with the distance the diamond is held from the tube during grading.

JCK-Jewelers Circular Keystone, 9/1/1998: ***What GIA’s Fluorescence Study Ignored By*** **Gary Roskin, G.G., FGA, Senior Editor**

“Having graded diamonds under Verilux lights that were filtered to remove almost all UV, I have seen diamonds with “Strong Blue” and, especially, “Very Strong Blue” fluorescence appear lower in color than when viewed under “normal,” traditional methods. **The difference can be quite dramatic, possibly by two or three color grades**. For example, an “E”-color diamond that fluoresces “Very Strong Blue” could be graded “G” or “H” under UV filtered light.”

Gems & Gemology, Volume 3, Fall 1941 Number 11
A Solution to Diamond Color Grading Problems
Robert M. Shipley and R.T. Liddicoat

"The presence, or absence, of imperfections plays an important role in the evaluation of diamonds, but imperfection detection does not offer as great a problem as the determination of color grades …

"The Diamondlite affords a light source as closely approximating daylight as possible. In addition, it controls the intensity of the light and the direction from which light falls upon the stone, preventing unwanted and falsifying reflections. The overabundance of the long rays of the spectrum (incandescent bulb), counter-balanced by a special blue filter, give, as a result, a light source that lacks only the ultra-violet rays of daylight."

Quote from Eunice R. Miles, Gems & Gemology, 1962, Volume 10, Number 12. P.358

"The GIA Diamondlite is especially valuable for color grading since it eliminates surface reflections and is free from ultraviolet radiation."

What GIA's Study Ignored: Jewelers Circular Keystone - Sept 1998

"According to Ilene Reinitz, research gemologist at GIA's Gem Trade Lab….

Certainly a lack of UV would allow a diamond to show its "true" body color without any additional blue fluorescence to enhance the color grade. "

Gems & Gemology, Volume 3, Fall 1941 Number 11 (Shipley & Liddicoat)

"Daylight itself varies so markedly from one part of the day to another, as well as one time of the year to another. There is a concentration of light of the wavelengths at one end of the spectrum during certain times of day, and the other end at other times. Also, different qualities of light are found on sunny and cloudy days. Smoke and dust in the atmosphere tend to make daylight more yellowish."

END