IPR2023-00613 and 614
U.S. Patent Nos. 10,411,582 and 10,566,895

Quasar Science LLC
Petitioner
v.
Colt International Clothing, Inc. d/b/a Colt LED
Patent Owner

Patent Owner's Demonstratives

Presented July 16, 2024

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

PROBLEM: CHANGING TUBES & GELS

PROBLEM

FLUORESCENT TUBES

Decades of employees changing tubes and gels

7. I showed him some of the Kino Flo fluorescent lighting tubes and explained various problems these tubes had. For example, they were only one-color temperature. When filming, if a new scene had to be shot with a different color temperature, gels had to be placed on the fluorescent light tubes or the tubes had to be changed out to another fluorescent tube at or closer to the right color temperature. This was and had been a significant problem given the number of tubes used on set, often a hundred or more. For the entire 25 years that I have been in the set lighting department, several employees have been working full time to add gels to tube lights, to remove them and/or to change between warm white tubes for cool ones.

Ex. 2066-Silva, ¶7

Also, Ex. 2068-Macias, ¶4
POR, pp. 47-48; POSR, p. 34

DEPENDENT CLAIM 12 & OTHERS: MAC TECH

MAC TECH FOR FILM/TV

BUT:

- **Mono color**
- **Too much green**
- **Only 10 Watts**
  - **(estimated 630 lumens even before losses)**

23	orientation, the Mac Tech ran at nine to ten watts,
24	so it is all very, very case specific. In the case
25	of a nine- to ten-watt running only horizontal with

Ex. 1043-Fisher.Depo. @113:21-25

8. I was aware of MacTech LED's single color LED lighting tube. The MacTech single color lighting tube only had one color temperature, either warm white or cool white. It also had light output that had a lot of green hues according to gaffers that were renting tubes. This meant that when the Mac Tech LED tube was being used, a gel had to be used on it. And it was only available in a rectangular frame with multiple tubes.

Ex. 2066-Silva, ¶8

POSR, pp. 23-24 (10W, est. 630 lm before losses, mono color; too much green)

CLAIM 1 - Bicolor Elements – 1[b], 1[c], 1[d]

b. a plurality of first LEDs mounted on the top side of the support structure and configured to emit broad-spectrum white light in a first predetermined Kelvin temperature range of cool white light;

c. a plurality of second LEDs mounted on the top side of the support structure and configured to emit broad-spectrum white light in a second predetermined Kelvin temperature range of warm white light;

d. electronic circuitry mounted to the support structure including an LED driver circuit configured for selectively electronically switching between driving either (i) the first LEDs, to provide light while the second LEDs are off; or (ii) the second LEDs, to provide light while the first LEDs are off, …

Ex. 1001, '582, Claim 1

CLAIM 1 - Tube "FFF" Elements – 1[a], 1[e], 1[f]

a. a housing having ends and including a support structure in a form of an elongated and narrow surface having a top side and a bottom side;

e. an elongate cover extending substantially a length of the support structure and covering the top side of the support structure for diffusing light emitted by the first and second LEDs; and

f. wherein the housing and cover together have a linear form factor of a fluorescent light tube lamp …

Ex. 1001, '582 Claim 1

CLAIM 1 – Emitted Light Quality Elements – 1[j]

j. wherein the light emitted from the LED light system is said suitable for the commercial image recording when said emitted light:

(i) is at least 1000 lumens when the first LEDs are lit and is also at least 1000 lumens when the second LEDs are lit;

(ii) is broad-spectrum white light having a color deviation corresponding to less than five points of green and less than five points of magenta (5M, 5G) of color compensation (CC), and

(iii) has a color rendering index of light emitted from each of the first LEDs or each of the second LEDs, whichever respective plurality of first or second LEDs is lit, that is greater than 90.

Ex. 1001, '582 Claim 1

WHY NOT MERE OPTIMIZATION

1. PETITIONER FAILS TO SHOW 1000 LUMENS
   particularly for a bicolor with all elements of claim 1
   POR, pp. 13-22; POSR, pp. 2-14

2. POSITA WOULD NOT DESIGN BEYOND RECOMMENDED THERMAL LIMITS
   to get 1000 lumens per color output, with the quality elements & FFF elements of claim 1, a POSITA would see likely thermal failure
   POR, pp. 22-32; POSR, pp. 14-22

3. UNAPPETIZING TRADEOFFS — POR, pp. 32-39; POSR, pp. 22-27

4. SECONDARY CONSIDERATIONS — POR, pp. 42-59; POSR, pp. 27-35

5. DEPENDENT CLAIMS – 42+ watts — POR, pp. 42, 59-64; POSR, pp. 35-36

GROUNDS 1 & 2 LACK 1000+ LUMENS: PETITIONER FAILS TO SHOW

PETITIONER FAILS TO SHOW 1000+ LUMENS

Petitioner: Kit: Ex.1004, 4:63-5:4 (52 x 20); 3:39-41 (K2: 45 LPW x 42 W); Hasnain 70-100 LPW

Ex. 1003-Holmes, ¶s 158-160, 490 (Ex.1004-Hasnain, 4:2-3)

1. Petitioner merely calculates output from LED rated LPW x Watts

Ex. 1003-Holmes, ¶s 157, 404 etc; POSR, pp. 2-3; Ex.1049-Holmes.Supp., ¶s 22-27

2. Petitioner's lumen calculations are all incomplete due to omitting losses associated with the luminaire of claim 1 POSR, pp. 2-8; POR, pp. 14-15; Ex.2080-Dr.Allen, ¶s 18-33, esp. 21; Ex. 2100, ¶s 175-179

LED qualities of G/M<5 & CRI>90 1[j](ii)-(iii) ; warm white 1[c] ; diffusion cover 1[e]; & other losses, e.g., thermal droop

3. Petitioner's calculations are irrelevant since LED quality and other factors are all speculative and/or conclusory (no evidence of wattage, CRI and/or G/M & fails to meet all elements)

Petitioner: "Even discounting the lumen yield for high CRI, the output…." Ex.1003-Holmes,¶158 (end)

POR, pp. 14-22; POSR, pp.2-8, 13-15; Ex.2080-Dr. Allen, pp. 11-24 (¶s 18-32, esp. ¶32); Ex.2100-Fisher, ¶s 175-179; E.g., Ex. 1049-Holmes.Supp., ¶s 22-27; Petition, e.g., pp. 33-35

Ex. 1001, '582 Claim 1[j]/1[j](i); Petition, p. ix

GROUNDS 1 & 2 LACK 1000+ LUMENS – LUMEN LOSS CHART

CLAIM 1 – LUMEN LOSS/PENALTY ELEMENTS

Element	Loss/Penalty	Support
1[j](ii) – G/M<5	≥ 15%	Ex. 2080-Dr. Allen, pp. 17-18, ¶s 26-27
1[j](iii) - CRI>90	≥ 24%	Ex. 2080-Dr. Allen, pp. 18-19, ¶29
Combined G/M & CRI	≥ 35%	Ex. 2080-Dr. Allen, p. 22, ¶31
1[e] – diffusion cover	≥ 20%	Ex. 1039-Dr. Allen.Depo., @54:2-6; 53:25-54:5; 51:4-20
1[c] – warm white	Significant	Ex. 2080-Dr. Allen, p. 22, ¶33; Ex. 1062, p. 1 (chart: from 75 LPW (cool) to 63 LPW (warm) at 90 CRI); Ex. 1003, ¶ 158 (60 LPW to 45 LPW); Ex. 1001, 10:59-60

POSR, pp. 5-10; POR, pp. 15-18

Exhibit 2127
Colt International
IPR2023-00614

GROUNDS 1 & 2 LACK 1000+ LUMEN: LUMINAIRE LOSSES

CLAIM 1 – LUMINAIRE LOSSES

Type of Loss	Loss/Penalty	Support
Driver, Diffuser, Thermal Droop	33% (max 67% efficiency)	Ex. 2080-Dr.Allen, p. 55, Ls 5-7 (¶78)(GE Energy Star)
1[e] - Diffusion Cover	20% (part of above losses)	Ex. 1039-Dr.Allen.Depo., @54:2-6; 53:25-54:5; 51:4-20
Thermal Droop	15% (part of above losses)	Ex. 1062, p. 2 (Graph: 15% loss from operating at 80°C compared to 25 °C for LED junction temp.); Ex. 2083-Cree Design Guide, p. 8 (graph)

POSR, pp. 6-7 (67% efficiency), pp. 8, 12 (diffusion cover), p. 17-fn 3 (thermal droop);
POR, pp. 16-22, 27 (p. 19: 67% max efficiency; luminaire losses)

Exhibit 2127
Colt International
IPR2023-00614

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

GROUNDS 1 & 2 LACK 1000+ LUMENS: SPECULATIVE

FAILURE TO SHOW 1000+ LUMENS, LUMINAIRE OUTPUT, PER COLOR

***Even Kit's 1,040 lumen version, with asserted 90 CRI, still lacks G/M bias specification, type of cover and not bicolor so speculative.**

(And loss of 20% for diffusion cover; 15% for G/M<5) **POSR, p.13; POR, pp. 20-22; Ex.1005, 4:63-5:4**

***Petitioner argues: select better LEDs but this means suffering lumen losses.**

POSR, pp. 9-10, §II.A.6(i). Ex.2080-Dr.Allen, pp. 17-19, (¶s 26-30)(LPW decreases with decreasing G/M bias and decreases with increasing CRI); Ex. 1062, p.1 (chart)

2013 Binning: G/M bias was only seven steps, not five, contrary to Petitioner's assertions

Ex. 1003-Holmes, ¶48 (Madpcb); Ex.2080-Dr.Allen, ¶s 70-73 (¶72 ("right half" of bin 573 incorrect))
POR, pp. 38-39; POSR, pp. 3, 10

GROUNDS 1 & 2 LACK 1000+ LUMENS: INCOMPLETE

FAILURE TO SHOW 1000+ LUMENS, LUMINAIRE OUTPUT, PER COLOR

***Petitioner argues that Macias is testing LEDs and/or just using LED LPW:**

But Macias examples and claim 1 are net of losses

-hindsight/reliance on "enablement"; '582 Patent does not have to mention losses

-'582 Patent tests "constructed" luminaire — Ex.1001-10:9-10, 48-49; 11:18-19; Ex.1001-6:31-33, Fig.2 (Lamp has a "diffusing shade cover 24"); POSR, pp. 3-4, 10-11, 24-27

***Petitioner argues that Cited references are not net losses**

But it is Petitioner's burden & e.g., Hasnain is not net-as I'll show

-speculative G/M bias, CRI, warm color temp., cover type — POSR, pp. 4-8 (incl. p. 7-fn 2), p. 12

GROUNDS 1 & 2 LACK 1000+ LUMENS: CANNOT USE 70-100 LPW

PETITIONER CANNOT USE HASNAIN'S 70-100 LPW FOR CALCULATIONS

* Hasnain's 70 to 100 LPW closely corresponds to 75 to 100 LPW for cool
* 1[j](i) requires 1000+ lumens for warm & 1[j](iii) requires CRI>90

Part No.	Chip Structure	Emitting Color	Color Rending Index (Ra)	Absolute Maximum Ratings (Ta=25℃)					Electrical and Optical Characteristics (Ta=25℃)									
				Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} (mA)	Operating Temperature Topr(℃)	Storage Temperature Tstg(℃)	Forward Voltage VF Typ.(V)	I_F(mA)	Chromaticity (x, y)	I_F(mA)	Luminous Intensity Iv Min. (cd)	Typ. (cd)	I_F(mA)	Luminous Flux Φv Typ. (lm)	I_F(mA)	Luminous Efficiency (lm/W)
PSL0102WBEA	InGaN	White (5,000K)	65	0.78	200※1	400※2	-40 to +130	-40 to +130	3.3	120	(0.345, 0.352)	120	8.2	12	120	44	120	100
PSL0102WBEB			80										5.4	10.8		38		95
PSL0102WBEC			90											8.2		30		75
PSL0102WBED			74										8.2	11.6		42		75
PSL0102WBFA		White (3,000K)	65								(0.437, 0.404)		8.2	10.6		37		93
PSL0102WBFB			80										5.4	8.5		31		78
PSL0102WBFC			90											7		25		63
PSL0102WBFD			75										8.2	10.6		37		93

※1:Mounting condition must be carefully considered ※2:Duty≦1/10, ≦10ms max.

EXCERPTED FROM EX. 1062 (p.1)

Ex. 1001, claim 1[j](i), (iii); Ex. 1062-datasheet, p. 1, chart; POSR, pp. 5-6
Ex.1008-Hasnain-1:6-10 (conventional, not TV/Film) & 3:63-4:3 (70-100 LPW)

Exhibit 2127
Colt International
IPR2023-00614

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

GROUNDS 1 & 2 LACK 1000+ LUMENS: WARM, G/M<5, CRI>90

PETITIONER MUST USE WARM WHITE, [G/M<5], CRI>90 PER CLAIM 1

Part No.	Chip Structure	Emitting Color	Color Rending Index (Ra)	Absolute Maximum Ratings (Ta=25℃)					Electrical and Optical Characteristics (Ta=25℃)								
				Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} (mA)	Operating Temperature Topr(℃)	Storage Temperature Tstg(℃)	Forward Voltage VF Typ.(V)	I_F(mA)	Chromaticity (x, y)	I_F(mA)	Luminous Intensity Iv Min. (cd)	Typ. (cd)	I_F(mA)	Luminous Flux Φv Typ. (lm)	I_F(mA)	Luminous Efficiency (lm/W)
PSL0102WBEA	InGaN	White (5,000K)	65	0.78	200※1	400※2	-40 to +130	-40 to +130	3.3	120	(0.345, 0.352)	120	8.2	12	120	44	120	100
PSL0102WBEB			80										5.4	10.8		38		95
PSL0102WBEC			90											8.2		30		75
PSL0102WBED			74										8.2	11.6		42		75
PSL0102WBFA		White (3,000K)	65										8.2	10.6		37		93
PSL0102WBFB			80										5.4	8.5		31		78
PSL0102WBFC			90								(0.437, 0.404)			7		25		63
PSL0102WBFD			75										8.2	10.6		37		93

※1:Mounting condition must be carefully considered ※2:Duty≦1/10, ≦10ms max.

EXCERPTED FROM EX. 1062 (p.1)

Ex.1001, claim 1[j](i), (iii); Ex. 1062-datasheet, p. 1, chart; POSR, pp. 6-7

Exhibit 2127
Colt International
IPR2023-00614

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

GROUNDS 1 & 2 LACK 1000+ LUMENS: 63 LPW, WARM WHITE, 90 CRI

USING PETITIONER'S 22W PROPOSAL W/ 63 LPW; NOT 70-100

per Ex. 1062-Petitioner's datasheet, 63 LPW for warm white at 90 CRI:

Watts	LPW (@ 3000K; CRI=90)	Total Pre-Loss Lumens	Green bias penalty (≥15%) Ex.2080,p.18-¶27	Subtotal	Luminaire Max Efficiency (67%) Ex.2080, ¶78-near end
22	63	22x63= 1386	1386x0.15= 208	1386-208= 1178	1178x0.67= **789 Lumens**

POSR, pp. 6-7 (complete calculations for proposal of Reply, pp. 4-5, Ex.1049-Holmes.Supp., ¶23)

Exhibit 2127
Colt International
IPR2023-00614

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

GROUNDS 1 & 2 LACK 1000+ LUMENS: DUROSITE

DUROSITE FAILS TO REACH 1000+ LUMENS

* No evidence of G/M, CRI, cover — POSR, p. 8; Ex. 2123, PDF@5; Ex. 1001, 2:47-50
* At warm white, 1450 lumens — Ex. 2123, PDF@5; Ex. 1049, ¶s 24-26
* Apply at least 35% G/M & CRI losses — Ex. 2080-Dr.Allen, p. 22, ¶31 (¶s 24-31)
* Apply 20% diffusion cover loss — Ex.1039-Dr.Allen.Depo., @54:2-6; 53:25-54:5; 51:4-20

only 754 lumens

POSR, pp. 8-9, 25-26
Ex. 1049, ¶25 (proposed)

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

GROUNDS 1 & 2 LACK 1000+ LUMENS: 44W WOULD NOT BE USED

PETITIONER'S 44W PROPOSED LUMINAIRES ARE UNSUPPORTED

*** No basis to apply 44 watts, conclusory, Hasnain not applicable**

POSR, pp. 8 & 24; POR, p. 64; Ex. 1049-Holmes.Supp., ¶s 23, 57-59; See Slide(s) 20-24

*** 22W to 44W doubles heat**

Ex.2080-Dr. Allen, ¶54 (linear relationship of power loading and heat) & ¶s 44, 60-61.

POSR, pp. 9, & esp. 14-15, 17, 35 (POSITA would not use 44W for Film/TV fearing damaging LED quality)

*44 watts is even greater than Hasnain's 0.9W/in x 44" usable length POSR, p. 15

*** Nothing close to 44W with a cover, housing** –see slide 44

GROUNDS 1 & 2 LACK 1000+ LUMENS: KIT'S FAILURE

GROUND 1 – KIT'S 1040 LUMEN & PROPOSED OLED 1200 LUMEN FAIL

* Kit improperly calculates 1040 lumens without any losses: 20 W x 52 LPW

65 tubular 4-foot LED lamp model should produce 1040 (20×52) lumens in a vertical direction beam output distribution over

Ex.1004-KIT, 4:65-66; POR, pp. 15-16; Ex. 2080-Allen, ¶s 75-78

*Applying best luminaire efficiency of 67% = 697 Lumens (even before losses)

POR, p. 19; Ex. 2080-Allen, ¶78

*No G/M bias (-15%) or diffusion cover (-20%) disclosed

POSR, pp. 3, 8; Ex. 1004-Kit, 4:43-5:4

*1200 lumen version inapplicable: GE OLED panel (15 LPW) - 576 sq. in.

Ex.1004-Kit, 12:22-33; POR, pp. 63-64; Ex. 2080-Allen, ¶s 89-93; Ex. 2082 (GE publication)

GROUNDS 1 & 2 LACK 1000+ LUMENS: KIT/KATZIR/K2 FAILURE

PETITIONER'S PROPOSED KIT/KATZIR/LUXEON K2 FAILS

* Omits calculations for G/M bias, CRI losses and other losses

POR, pp. 14-22; POSR, pp. 2-5, 8-13, 24-25

* Omits any basis for why a POSITA would apply 42W POR, pp. 17-19, 42, 61; POSR, p. 14

* Has unrealistic efficacy-requires 221 LPW at Katzir's 14W

Ex.1004-Kit, 3:26-56; Ex. 1003-Holmes, ¶s 142, 158-159; POR, pp. 19-21; §§XII.B. & XII.C.
Ex. 2080-Allen, ¶s 75-85; Ex. 1006-Katzir, [0026]("14 watts")
In re Kahn, 441 F.3d 977, 988 (Fed.Cir. 2006)(obviousness requires a rational reason)

* Lacks explanation of how to convert mono color output into a luminaire output in a bicolor (and all other versions) POR, pp. 21-22, 39-40; POSR, pp. 13 & 25

POR, pp.14-22 17-19, 42, 61 (42W – no basis); POSR, pp.2-3, 8, 13-15

Exhibit 2127
Colt International
IPR2023-00614

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

PETITIONER'S PROPOSED USES OF HASNAIN FAIL

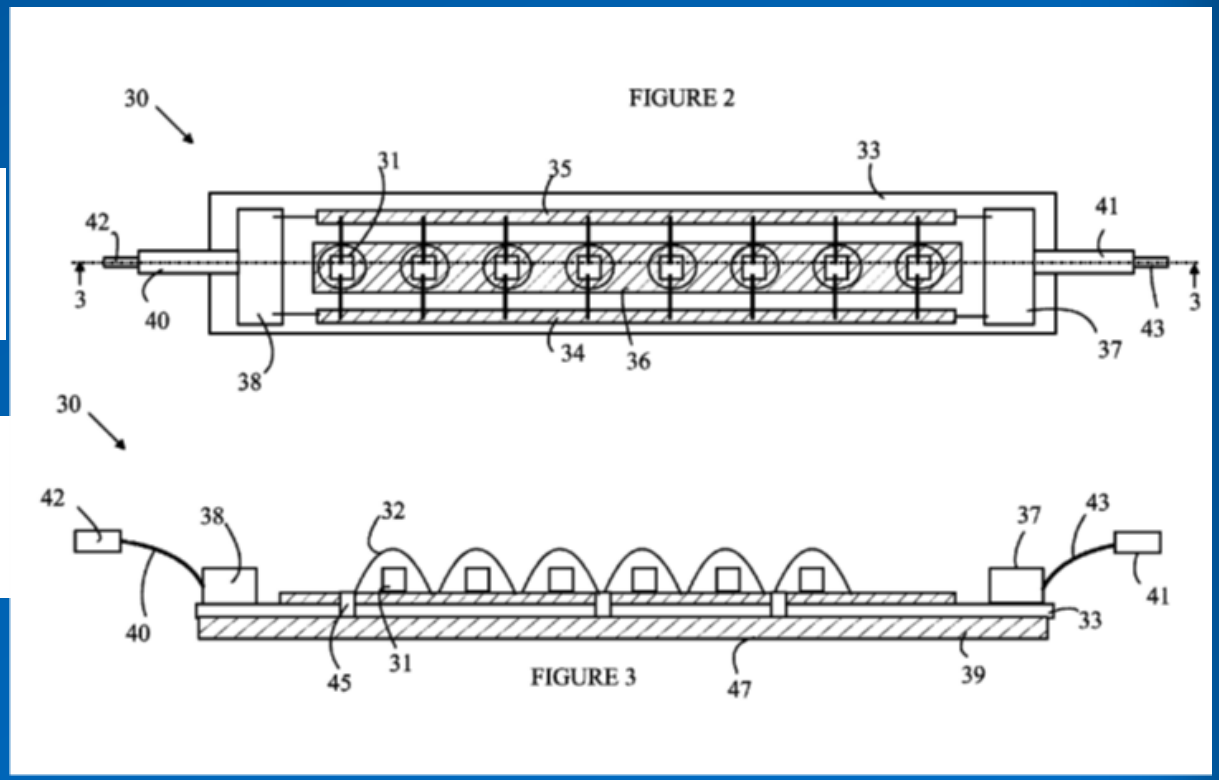
Hasnain is specifically open-air for venting; no cover, no housing

modated. Each LED is also mounted on a heat-dissipating structure **36** that aids in the transfer of the heat generated by the LEDs to the ambient environment. The manner in which

Ex. 1008-Hasnain-3:51-53

Refer again to FIG. **2**. For example, if the substrate has a heat-radiating surface that dissipates the heat to the surrounding air such as the surface of heat-dissipating structure **36**, the

Ex. 1008-Hasnain-5:65-67



Holmes admits "…output power of an LED light is limited by the free-air dissipation…" Ex.1003,¶54

POR, pp. 18, 27; POSR, pp. 12-13; Ex. 2080-Allen, ¶s 48-50; Figs. 2-3

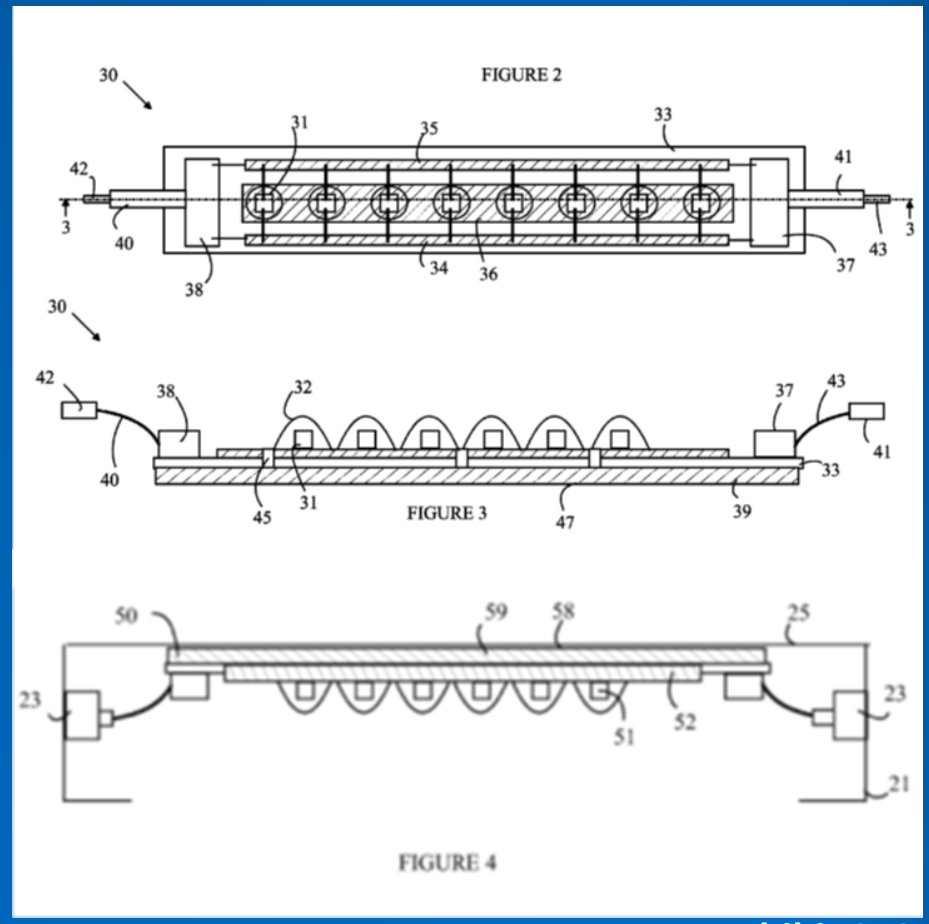
Exhibit 2127
Colt International
IPR2023-00614

PETITIONER'S PROPOSED USES OF HASNAIN FAIL

Hasnain's heat-dissipating surfaces 36, 47 and structure 59 will not work with a cover & housing

Then he adds, what is it, 47, referring to, in thermal contact with 36. What he is doing is adding a bigger spreader, okay. It looks thicker. It looks wider. And so he is getting more surface area which he claims is wonderful. It is not. He is transferring heat from the LEDs to a spreader, to a bigger spreader and it is still on a benchtop. That hot air that comes out from the spreader is allowed to freely circulate into the air of his laboratory.

In a tube LED lamp, both of those spreaders will be enclosed in the cover and housing. So we are just making the air inside the tube hotter with the spreaders. We are not getting the heat out of the tube.



POSR, p.16; Ex.1039-Dr.Allen.Depo.@97:4-19; Ex.2080-Dr.Allen, ¶s 66-68; Ex.1008; Figs. 2-4

Exhibit 2127
Colt International
IPR2023-00614

PETITIONER'S PROPOSED USES OF HASNAIN FAIL

Hasnain's attachment to the troffer wall 25 will not work with cover & housing

Requires rigid attachment to the troffer wall

Unclear how a POSITA would do it with an FFF/tube format

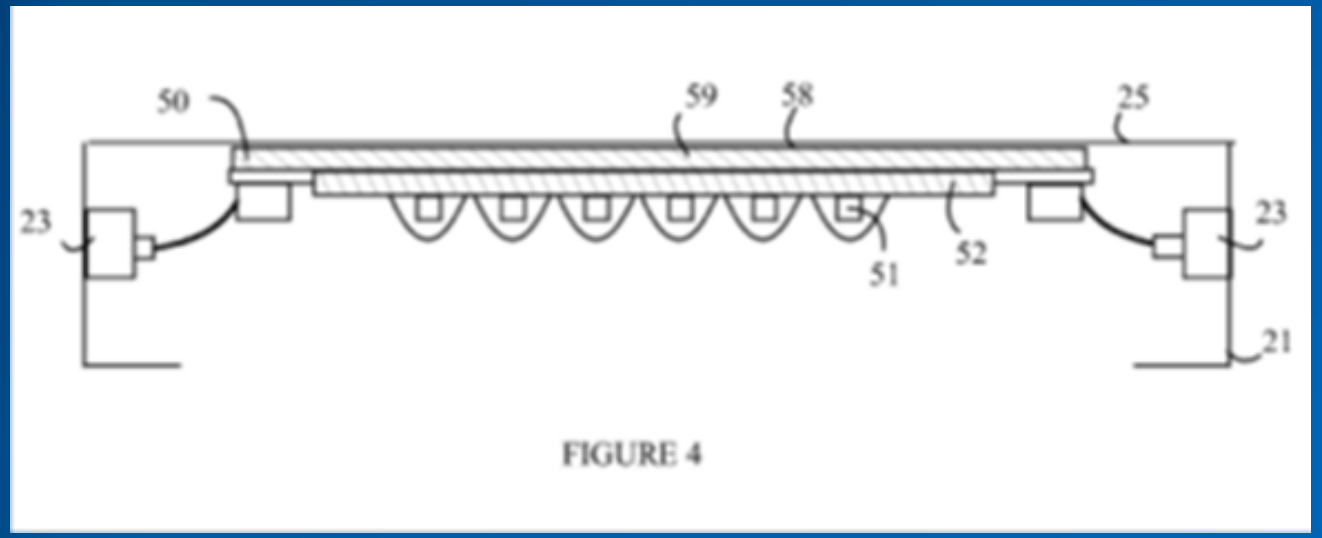


FIGURE 4

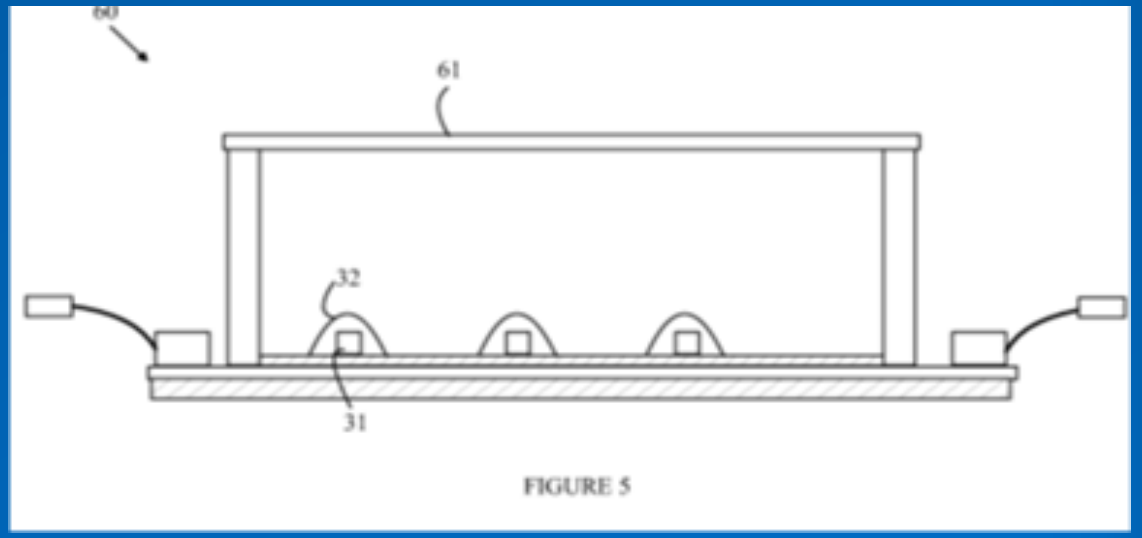


FIGURE 5

POSR, pp.16 & 19-20; Ex.1039-Dr.Allen.Depo.@96:22-97:19;
Ex.2080-Dr.Allen, ¶s 66-68 & 39-40; Ex.1008-Hasnain; 5:3-5 (troffer wall); Figs.4-5

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

PETITIONER'S PROPOSED USES OF HASNAIN FAIL

Hasnain's "lens 61" is not a cover and also still lacks a housing & FFF

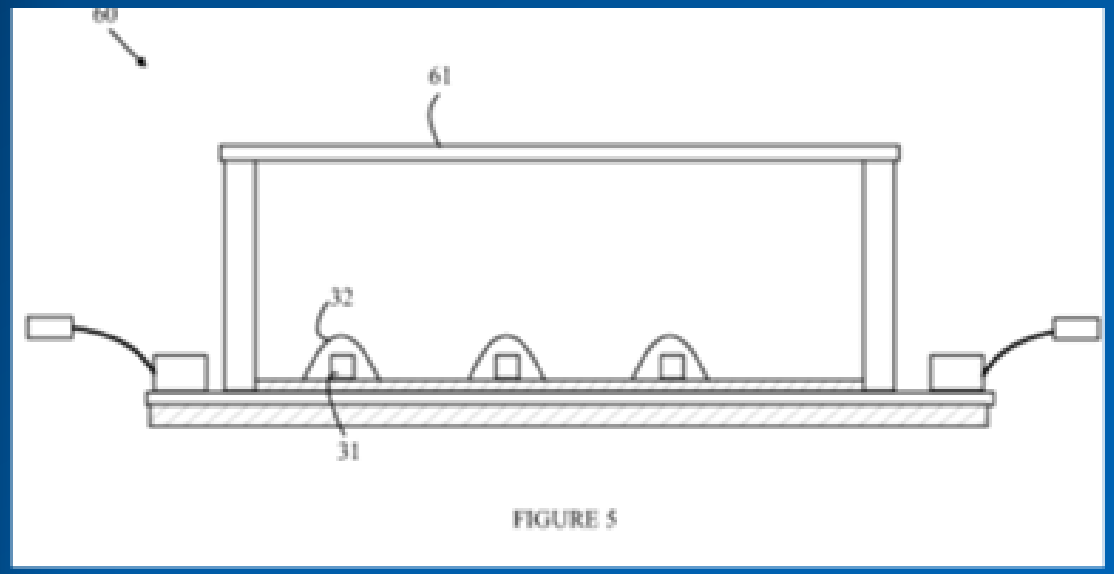


FIGURE 5

broad linear sources. Hence, in some applications, additional optics may be necessary to give the appearance of a fluorescent tube-like light source. Since the individual LEDs are of order 2 or 3 mm, a cylindrical lens that is located one or two inches above the LEDs can transform the collection of point sources into a linear source that is collimated or that diverges at a predetermined angle. Such an arrangement is shown in FIG. **5**, which is a cross-sectional view of another embodiment of a light source according to the present invention. In light source **60** a cylindrical lens **61** is mounted above the LEDs. It should be noted that most fluorescent tube enclosures have a depth of a few inches, since the enclosures must accommodate fluorescent tubes that are typically 1.5 inches in diameter. Hence, the LEDs appear as point sources at the lens.

POSR, pp. 20-21; Ex.1008-Hasnain, 6:48-60, Fig.5

NONOBVIOUSNESS DUE TO THERMAL LIMITS: DUCHARME COVER

PETITIONER'S PROPOSED USES OF HASNAIN FAIL

Ducharme cannot be modified by Hasnain due to Ducharme's cover

4	What is shown in here is air slots. I know
5	it to be ineffective. They provide some cooling, an
6	order of magnitude factor of less than 10, less than
7	good thermal management heat. I do not want to leave
8	you with the impression that is a thermal management
9	solution. It is not.

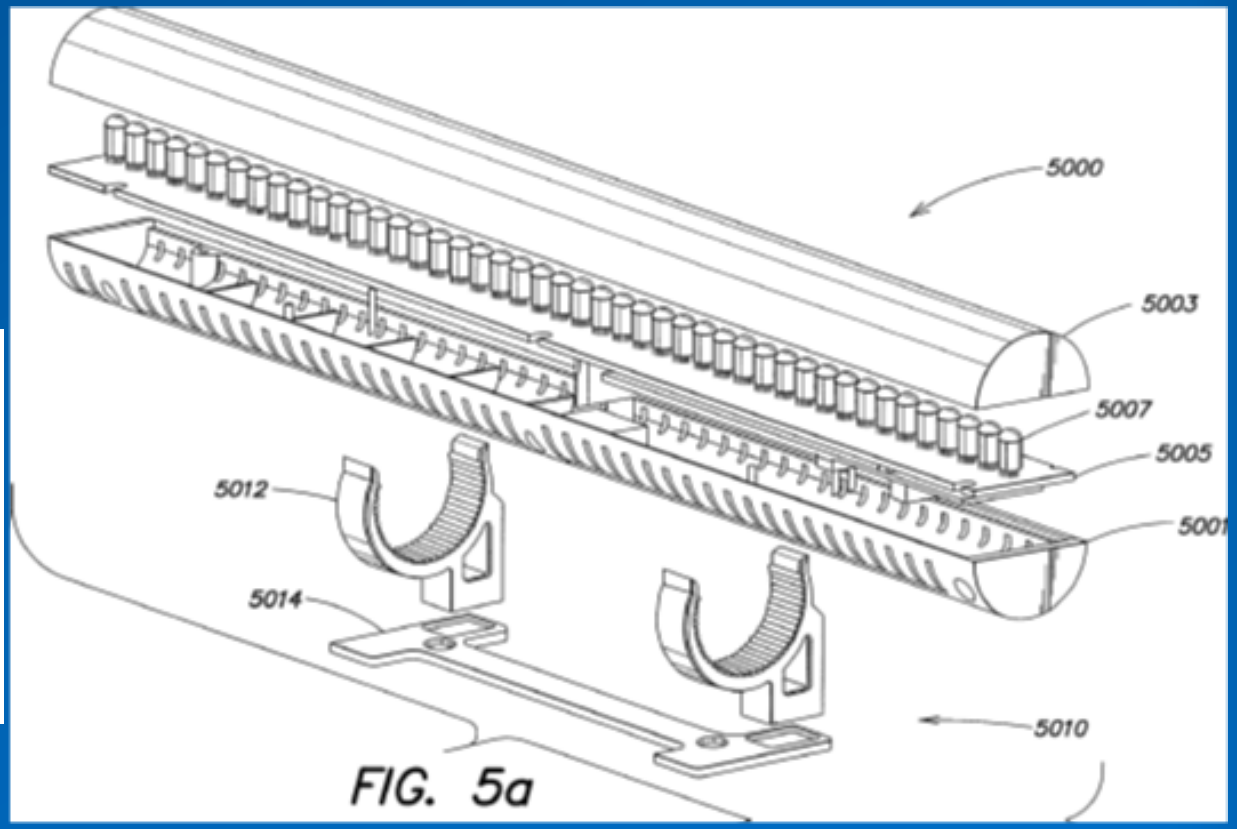


FIG. 5a

Ex.1039-Dr.Allen.Depo@107:4-9 and @105:4-107:9;
Ex.1005-Ducharme, 12:49-53, Fig. 5a; POSR, pp.21-22

PETITIONER NEVER SHOWS HOW ONE WOULD APPLY WATTAGE TO A BICOLOR

KIT IS NOT BICOLOR

*Kit lacks any disclosure of bicolor (no cool white with warm white LEDs)

new line of Luxeon white LEDs at Lightfair 2005. The solution to the wide manufacturing tolerances for achieving a consistent color temperature and intensity was to introduce color-matched white Luxeon Lamps, each containing multiple white Luxeon LEDs that are selected by advanced binning algorithms. By correctly combining an appropriate mix of LEDs, the Luxeon Lamps themselves have well-controlled and consistent color temperatures of 3200K (warm white), 4100K (commercial white) or 5500K (cool white). Lumileds Lighting intends to release their new Luxeon Rebel high-brightness LEDs in 2007. **Ex.1004-Kit, 3:28-38**

*Kit is color-matching to create one color temp & focused on efficiency **Ex.1004-Kit, 3:28-38, 13:34-38**

*Any modification of Kit would not be bicolor: No explanation of how to translate Kit mono-color to bicolor or apply wattage in a bicolor

* No mention of Film/TV; energy saving

POR, pp. 5-6, 21-22, 39-40; POSR, p. 13

THERMAL LIMITATIONS

A COVERED, HOUSED FFF LUMINAIRE WITH 1000+ LUMENS AND G/M<5 & CRI>90 HAS HEAT ISSUES

* Hasnain – purpose to limit heat — Ex. 1008, 4:23-27; also, slides 21-24

* Macias – thermal failures — Ex. 2068-Macias.Decl., ¶9

* Dr. Allen's analysis — Ex. 2080-Dr. Allen.Decl., §II, ¶s 35-62

POSR, pp.1, 5-6, 11-13, 15-21; POR, pp. 8, 26-33

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

THERMAL LIMITATIONS: EXPERT OPINIONS

A POSITA WOULD FACE SUBSTANTIAL THERMAL ISSUES AND AVOID THEM FOR FEAR OF DAMAGING LIGHT QUALITY

THEREFORE NOT COMBINE THE ELEMENTS AND/OR NOT HAVE A REASONABLE EXPECTATION OF SUCCESS

*** Both experts Fisher and Baxter, entertainment lighting device designers, conclude the claimed invention would be a bad idea at the time; failure likely**

Ex.2100-Fisher, ¶s85, 98, 137 (POR, p. 23); Ex.2047-Baxter, ¶s73-76,29-49 (POSR, p 23; POR, pp.23-25,28-30,34) (see also, Ex. 2047, ¶s31, 52-54; POR, pp.33-35)

*** Dr. Allen's analysis shows why**

Ex. 2080-Dr. Allen.Decl., ¶41 (p.27-bottom)
POR, pp. 26-27; POSR, pp. 15, 19

in Commercial Image Recording. The additional, critical factors omitted by Hasnain and Holmes would cause the junction temperature of the LED to be overheated by at least about 50 °C in a typical Commercial Image Recording application (and possibly substantially more depending upon the luminaire design specifications which include but are not limited to just the LED specifications).

POSR, pp. 1, 14-18; POR, pp. 34, 26; Ex. 2080-Dr. Allen.Decl., §II, ¶s 35-62

THERMAL LIMITATIONS: IRREPARABLE DAMAGE TO LED QUALITY

A POSITA WOULD FACE SUBSTANTIAL THERMAL ISSUES AND AVOID THEM

* Avoidance for fear of damaging light quality and therefore not combine the elements and/or not have a reasonable expectation of success

POSR, pp. 9, 15-17, 35; POR, p. 27; Ex. 2080-Dr. Allen.Decl., §II, ¶s 35-62, esp. 41, 44, 60-62; POR, pp. 1, 27, 30-31, 35

* Dr. Allen explains that this overheat will cause irreparable damage to the LEDs' CRI and G/M bias

Ex. 2080-Dr. Allen.Decl.,¶41 (p.28-top)
POR, pp. 26-27; POSR, pp. 15, 19

> Commercial Image Recording application, i.e., by **very quickly irreparably destroying phosphors in the LED and thus very quickly irreparably destroying CRI and/or resulting in loss of the G/M 5 Point Limit of 1[j](ii) and 1[j](iii)**. Therefore, a POSITA would not have a reasonable expectation of success

POSR, pp.1, 14-18 & 19-22; POR, p. 27; Ex. 2080-Dr. Allen.Decl., §II, ¶s 35-62

THERMAL LIMITATIONS: POSITA WOULD DESIGN WELL BELOW RISK LEVEL

A POSITA WOULD WANT TO STAY SIGNIFICANTLY BELOW RISK OF DAMAGE, THUS NOT COMBINE THE ELEMENTS AND/OR NOT HAVE A REASONABLE EXPECTATION OF SUCCESS

*** A POSITA would design well below risking damage to LED quality**

Ex. 2080-Dr. Allen.Decl., ¶41 (p.28-mid); POR, pp. 26-27; POSR, p. 15

(1[j](ii)) and CRI > 90 (1[j](iii)) for Commercial Image Recording. A POSITA, designing a luminaire for commercial image recording having the claimed elements including the 1000 Lumen Minimum (1[j](i)), G/M 5 Point Limit (1[j](ii)) and CRI > 90 (1[j](iii)) would want a thermal design that stays significantly below risking and below appearing to risk any damage to the LEDs and thus to The Claim 1[j](i)-(iii) Requirements to maintain suitability for commercial image recording.

POSR, pp.1, 15-18; POR, p. 27; Ex. 2080-Dr. Allen.Decl., §II, ¶s 35-62

THERMAL LIMITATIONS: DR. ALLEN'S THERMAL ANALYSIS

*AMBIENT ON SET: Stacking lights, design for 45°C — Ex.2080-Dr.Allen, ¶53; POR, pp.28-29

* HASNAIN POSTULATED RISE IN OPEN-AIR: 30°C — Ex.2080-Dr.Allen, ¶50; POR, pp.27-28

* EFFECT OF COVER: at least 20°C — Ex.2080-Dr. Allen, ¶51; POR, pp. 27-28

* COLOR ADJUSTMENT OVERHEAT: wattage to overcome losses for 5<G/M & CRI>90-adds at least 27°C — Ex. 2080, ¶54; POR, p. 29-bottom

* OTHER FACTORS: black wrap/gel 10-20°C — Ex. 2080, ¶s 48 & 57; POR, p. 30

Also, Ex. 2041-Csernecky, ¶s 7, 9 & 24-27, and its Ex. 2042 (stacked lights) and Ex. 2043 (tube taped to wall)

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

THERMAL LIMITATIONS: CREE DESIGN GUIDE LIMIT - 80°C

• AMBIENT	45°C	Ex.2080-Dr.Allen, ¶53; POR, pp.28-29
• RISE IN OPEN-AIR	+30°C	Ex.2080-Dr.Allen, ¶50; POR,pp.27-28
• COVER:	+20°C	Ex. 2080-Dr. Allen, ¶51; POR, pp. 27-28
• COLOR ADJUSTMENT:	+27°C	Ex. 2080-Dr. Allen, ¶54; POR, p. 29-bottom
TOTAL =	122°C	

OTHER FACTORS: 10-20°C Ex. 2080, ¶s 46, 48 & 57

140 to 150°C Ex. 2080, ¶59

CREE RECOMMENDATION/POSITA THERMAL LIMIT PER DR. ALLEN: 80°C

Ex. 2080-Dr. Allen, ¶s 44 & 52; POR, pp.29-31,35; POSR, pp. 17-18

Ex. 2083-Cree Design Guide, p. 8-bottom; p. 13-example

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

Exhibit 2127
Colt International
IPR2023-00614

THERMAL LIMITATIONS: CREE DESIGN GUIDE – Ex. 2083

CREE RECOMMENDATION & POSITA THERMAL LIMIT PER DR. ALLEN: 80°C

Ex. 2080-Dr. Allen, ¶s 44 & 52; POR, pp.29-31,35; POSR, pp. 17-18; Ex. 2083-Cree Design Guide, p. 8-bottom

XLamp XR-E LEDs are rated to provide an average of 70% lumen maintenance after 50,000 hours, provided the junction temperature is kept at 80 °C or lower. Therefore, the appropriate maximum junction temperature for the CFL example is 80 °C. This corresponds to a minimum relative luminous flux of 85%, as shown in Chart 3. This 85% relative luminous flux is the thermal efficacy estimate for the example luminaire.

Ex. 2083-Cree Design Guide, p. 8-bottom

Guide), p. 8, bottom paragraph (italics added for emphasis). In fact, due to the combination of the need for maintaining the G/M 5 Point Limit and the CRI > 90 as well as the lumen output, and on film or TV set conditions such as wrapping a luminaire in black wrap or a gel and/or taping it against a wall where the thermal circuit is blocked or hampered, a POSITA would certainly not want to go above the Cree Design Guide recommended p-n junction 80 °C limit.

Ex. 2080-Dr. Allen, ¶ 44

Ex. 2083-Cree Design Guide, p. 8-bottom

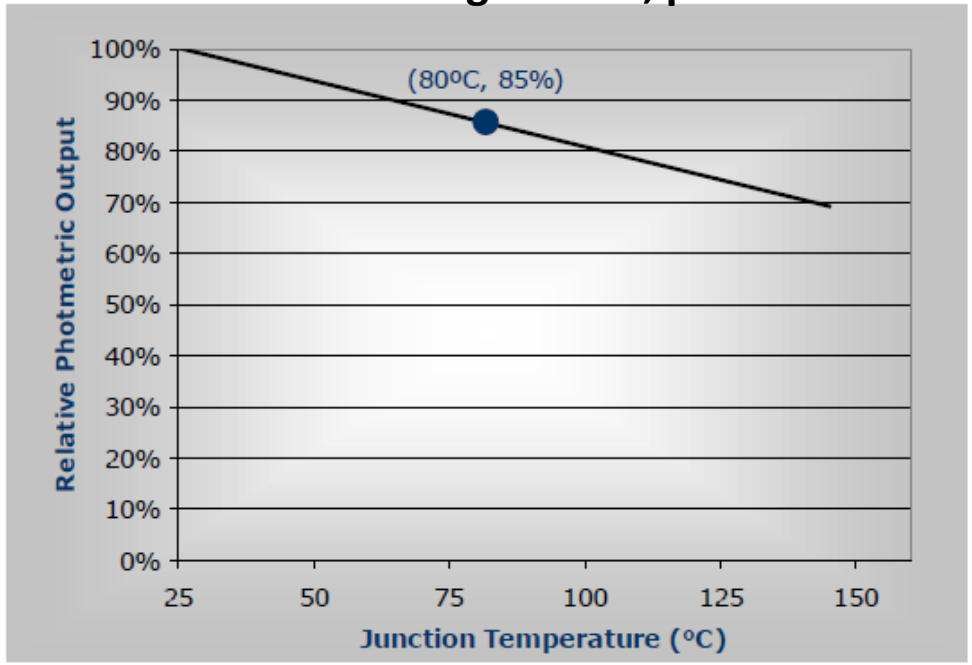


Chart 3: Example relative intensity vs junction temperature graph for XLamp XR-E white LED

Exhibit 2127
Colt International
IPR2023-00614

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

THERMAL LIMITATIONS: COLOR SHIFT REPORT – EX. 2086

The Color Shift Report teaches even small thermal changes can quickly degrade color qualities (four times more likely and chromaticity shifts towards green).

Ex.2086-Color Shift Report, p.19; Ex.2080-Dr.Allen, ¶s60-61; POR, pp. 30-31, 36; POSR, p. 17

The chromaticity shift seen in the warm white LEDs after 3,500 hours ALT is attributed to a significant change in the characteristics of the emission spectrum in the red/orange region, with the main peak shifting from approximately 610 nm to 601 nm (Figure 15). This shift in the red peak wavelength will continue to increase under more aggressive ALT conditions. After 4,000 hours of ALT at 85°C and 85% relative humidity (85/85), the peak shifted from 610 nm to 580 nm, as seen in Figure 16. The move from 75/75 to 85/85 corresponds to an acceleration factor of approximately 4X. The study concluded that the spectral shift was due to degradation of the red oxy-nitride phosphor in the presence of oxygen from the moisture present in WHTOL testing, causing the red emission wavelength peak to shift shorter. The shortened red emission ultimately caused chromaticity shift of the warm white LED emission towards the green spectral region.

Ex.2086-Color Shift Report, p.19

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

UNAPPETIZING TRADEOFFS

PETITIONER FAILS TO SHOW MOTIVATION TO COMBINE AND/OR REASONABLE EXPECTATION OF SUCCESS OF ALL ELEMENTS OF CLAIM 1 DUE TO "UNAPPETIZING" TRADEOFFS

Henny Penny Corp. v. Frymaster LLC, 938 F.3d 1324, 1332 (Fed.Cir. 2019) (no motivation: tradeoffs yielded "unappetizing combination").

1. High lumen output for each color contrary to thermal management and efficiency due to current droop and thermal droop

Ex.2100, ¶177 (doubling drive current per LED causing current droop losses); Ex.2047, ¶53 (p.13).

2. Narrow form factor for bicolor suitable for film/TV contrary to thermal management; strong diffusion cover to avoid point source but reduces output + worsens thermal issues

Ex.2080, ¶s 39-61; Ex.2100 (Fisher Decl.), ¶s 73-75 (& 53-54, 64, 138, 151); Ex.2047-Baxter, ¶s 45-51 (heavy diffusion)

3. High CRI together with low green contrary to high lumen output and efficiency

Ex.2080, ¶s22,78; Ex.2100, ¶85 (adverse effects of more wattage); Ex.2047, ¶s 31, 52-54; Ex. 2083, p. 8; Ex. 2086, p.19

4. Thermal design issues with all elements of claim one including onboard LED driver

POR, pp. 22-32, §VIII (thermal issues)

POR, pp. 33-36; POSR, pp. 22-27

Exhibit 2127
Colt International
IPR2023-00614

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

SECONDARY CONSIDERATIONS REINFORCE NONOBVIOUSNESS: NEXUS

THERE IS NEXUS

WBIP, LLC v. Kohler Co., 829 F.3d 1317, 1331-32 (Fed.Cir. 2016)(nexus without tying to new elements when combination of known elements)
Fox Factory, Inc. v. SRAM, LLC, 944 F.3d 1366, 1394 (Fed.Cir. 2019)(just show "product is essentially the claimed invention," not perfect)

1. **Colt's bicolor matches the claimed invention (unchallenged)**

   Ex.2051-Hoffman, ¶s5-6; Ex.2053-claim chart, pp.1-10; Ex.2068-Macias, ¶39

2. **Colt markets what is critical: bi-color tube, G/M<5, high CRI, light output**

   Ex.2068-Macias, ¶s 10,19, Exs.2069, 2072, 2077; Ex.2041, ¶s 13-14; Ex.2067, ¶s12,14; Ex.2066-Silva, ¶s 10-11

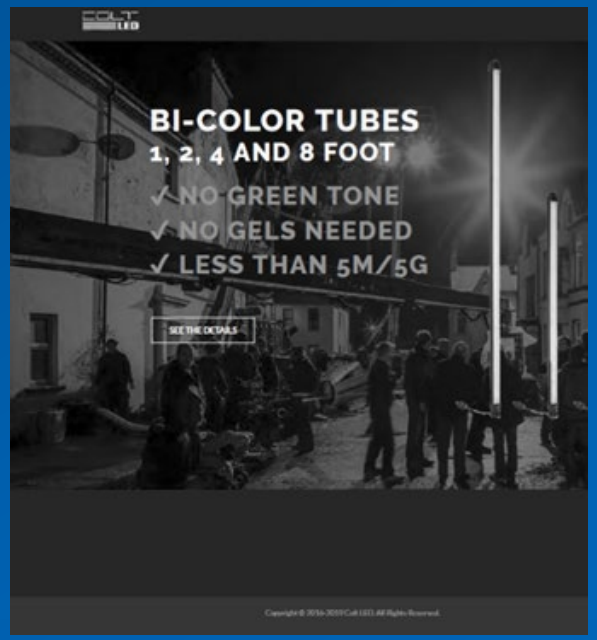




FIG. 1 LUMINAIRE

Test Summary

Distance (ft)	Color Settings	CCT	CRI	Lux	FC
4	D	5796	94.5	597	55.46
8				165.91	15.41
12				74.71	6.94
16				42.56	3.95
4	T	3107	96.6	554	51.47
8				154.11	14.32
12				69.51	6.46
16				39.51	3.67

Page 2 of 3

COLT INTERNATIONAL CLOTHING, INC EXHIBIT 2077
Page 2 of 3

POR, pp. 43-47; POSR, pp. 27-29

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

SECONDARY CONSIDERATIONS REINFORCE NONOBVIOUSNESS: NEXUS

THERE IS NEXUS

Quasar's bicolor matches the claimed invention & markets the same as Colt

'582: Ex.2051-Hoffman, ¶12; Ex.2059 (Claim Chart '582 Patent vs Quasar S-Switch)

'895: Ex.2051-Hoffman, ¶12; Ex.2059 & 2065 (Claim Chart '895 vs. Quasar Crossfade)

Red herrings: tying to new elements and/or aluminum housing **POSR, p. 30**

At Quasar Science, we attempt to optimize the conjunction between excellent CRI, lasting color performance and maximum output, producing the highest lumens per watt possible while retaining Quasar Science's renown color spectrum.



All Quasar products have a CRI of 95+
with 0CC (no Magenta or Green spikes)

A color rendering index (CRI) is a quantitative measure of the ability of a light source to reveal the colors of various objects faithfully in comparison with an ideal or natural light source. Light sources with a high CRI are desirable in color-critical applications such as neonatal care, photography and cinematography. It is defined by the International Commission on Illumination (CIE) as follows:

Ex.2075, p.1

POR, §XI.E.2., pp. 44-46; POSR, pp. 29-30

SECONDARY CONSIDERATIONS: SALES

SALES IN THE MILLIONS

Approximately $6.6 million sales first three years - unchallenged

Over $3.0 million Colt bicolor

About $3.6 million Quasar S-switch by Colt's estimate

Ex.2068-Macias, ¶s 21 (Colt), ¶33 (Quasar); ¶s 29-32 (support for estimate)

Quasar's '895 sales-see 2017 and on – several times larger

Ex. 2093, pp. 4-5 & 11-13; POR, pp. 56-57 (IPR2023-00614)

Petitioner does not challenge Patent Owner's entitlement to Quasar's sales

POSR, p. 29

POR, pp.55-57

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

SECONDARY CONSIDERATIONS: PRICE

COLT'S PRODUCTS COMMANDED A HIGH PRICE

Colt bicolors rented for twice what Kino Flo fluorescents were and sold for ten times retail of Kino Flo POR, pp. 58-59; Ex.2068-Macias, ¶s 36-38; Ex.2066-Silva, ¶38

Ex.2076, p. 4



Kino Flo (6) 4ft. 5500K Daylight Fluorescent T12 Bulbs | Lamps | Tubes 488-K55-S

1 Review

SKU: 6pack-488-K55-S

Availability: Usually ships the next busin

Our Price: $137.70

~~Price: $162.00~~ You Save: $24.30 (1

Quantity: 1

ADD TO FAVORITES

36. The standard retail price of Colt's Bicolor LED Tubes as offered by Colt in the four-foot T12 size was about $250 per tube as of 2017 to 2019 for retail sale.

37. Attached as Exhibit 2076 is a copy of some printouts from January 2019 showing some prices for purchasing six Kino Flo fluorescent tube lights for film and television lighting in four-foot T12 sizes, averaging about $23 per bulb for retail sale, less than one tenth the retail price ($250) of Colt's Bicolor LED Tube

Exhibit 2127
Colt International
IPR2023-00614

SIGNIFICANT MARKET SHARE

Colt's bicolor and Quasar's products achieved significant market presence

Several big studios rented Colt's bicolor POSR, p. 29; POR, pp. 57-59; Ex.2068-Macias, ¶20

18. I have been on several productions over about the last ten years where Colt's Bicolor LED Tubes have been used and over the last seven or eight years bicolor LED lighting tubes made by Quasar Science LLC. More than half of all productions that I have worked on or seen over the past seven to eight years or so have used Colt's Bicolor T12 Tubes (or Quasar Science's bicolor T12 tubes having all the same above-listed features in paragraph 14). I have rarely seen any productions using fluorescent tube lights in the last three to four years. Over the last two to three years, almost every production that I have worked on has used one of Colt's or other (Quasar's) bicolor LED lighting tubes.

Ex.2041-Csernecky, ¶18

14. Due to the features and benefits of Colt's Bicolor LED Tube, especially 13(a) to (e) above, in 2013, Paramount purchased a substantial number of Colt's Bicolor LED Tubes and introduced it in the rental department. Since introduction of Colt's Bicolor Tube light at Paramount, it has been used in about 90% of all new productions that Paramount supplies. This equates to about 18 of the 20 new productions per year.

16. Colt's Bicolor Tube light has completely replaced fluorescent tube lights as the standard at Paramount.

Ex.2067-Wonderlick - ¶s 14, 16

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

SECONDARY CONSIDERATIONS: LONG FELT NEED/AVOIDANCE

SEVERAL COMPANIES AVOIDED BICOLOR TUBES

1. Award-wining Litepanels failed to see a path to success for an LED tube

2. Kino Flo, 25 year industry leader, avoided tubular format

Ex.2100, ¶127; Ex.2047, ¶77; Exs.2048-49 (from fluorescent tube to LED panel)

27. **Likelihood of Success: NO**. After finishing the Evaluation, it was my firm conclusion that combining the components into an integrated LED Core Tube System would likely fail under the demanding conditions seen in film and television lighting industry—thereby creating financial liabilities, including a high risk of product recalls. So, I killed the idea of doing tubular LED lights.

Ex.2047-Baxter, ¶27

3. Arri & MacTech avoided bicolor tubes -used panels for bicolor LED lights

Ex.2100-Fisher, ¶s 126-132, esp. 127; Exs. 2104-2107

4. BBS Lighting used remote phosphor and avoided bicolor LED tube lights

Ex.2100-Fisher, ¶s 133-138 (BBS Lighting remote phosphor)

POR, pp. 48-51; Ex.2047-Baxter, ¶s 23-72 (evaluation of LED tube format; Ex.2100-Fisher, ¶s 126-132 (Mac Tech & Arri avoiding bicolor tube), 7, 14-15, 140; ¶s 10, 96 (Kino Flo innovator), ¶s 123-125, 133 (BBS Lighting – remote phosphor)

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

SECONDARY CONSIDERATIONS: COPYING

EVIDENCE OF COPYING IS CORROBORATED

Zhang 2018 deposition transcript & 2018 declaration show copying

Ex.2036 ('582); Ex.2039 ('895); Ex.2079-Zhang.Depo. @53:1-55:25; Ex.2068, ¶s 22-28 POR, pp. 52-55

Copying is corroborated by undisputed evidence:

Quasar tried to make a bicolor LED tube, but it couldn't

Ex.2079, 21:7-19, 14:10 – 16:10; POR, pp. 50-51

Uncontroverted evidence that Quasar's Gonzalez obtained samples

Ex.2066-Silva, ¶s 15-18; POSR, p. 32; POR, pp. 51-52

Photos of Colt's disassembled product with manufacturer

Ex. 2079, PDF 94-95 (photos) & 22:3-25; Ex.2068-Macias, ¶26; POSR, pp. 32, 34; POR, pp. 51, 54-55

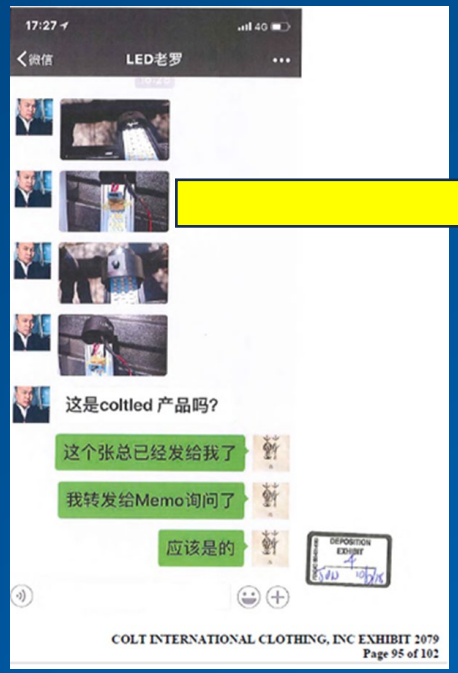
Gonzalez & Lau were both with Quasar; Not disputed by Gonzalez

Ex. 2079, 71:8-12; Ex. 1059-Gonzalez; POSR, p. 32 (top); POR, pp. 51-55

Exhibit 2127
Colt International
IPR2023-00614

SECONDARY CONSIDERATIONS: CORROBORATION OF COPYING

PHOTOGRAPHIC CORROBORATION



Ex.2079, @PDF95



Ex. 2079, PDF 94-95 (photos) & 22:3-25; Ex.2068-Macias, ¶26; POSR, pp. 32, 34; POR, pp. 51, 54-55

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

Exhibit 2127
Colt International
IPR2023-00614

SECONDARY CONSIDERATIONS: COMBINED

SECONDARY EVIDENCE MUST BE CONSIDERED AS A WHOLE AND CAN SUM TO SUBSTANTIAL WEIGHT EVEN IF INDIVIDUALLY INSUBSTANTIAL

Volvo Penta of the Americas, LLC v. Brunswick Corp., 81 F.4th 1202, 1215 (Fed.Cir. 2023)

1. LONG-FELT NEED
2. SALES IN THE MILLIONS
3. COLT'S PRODUCTS COMMANDED A HIGH PRICE
4. SIGNIFICANT MARKET SHARE
5. SEVERAL COMPANIES AVOIDED BICOLOR TUBES
6. COPYING

POR, pp. 42-59; POSR, pp. 27-35

DEPENDENT CLAIM 12 & OTHERS: 42+ WATTS INPUT

42+ WATTS: EXTREME FOR A COVERED TUBULAR LUMINAIRE

> **12**. The LED light system of claim **1**, further comprising a power supply configured to provide at least 42 watts, and wherein the LED driver is configured to selectively drive the first LEDs with at least 42 watts and the second LEDs with at least 42 watts. **Ex. 1001, Claim 12**

'582 Claims: 12, 13, 29 & 30 Ex. 1001 **'895 Claims: 12, 13, 22, 28 & 29** Ex. 1001

22W to 44W doubles power loading, doubling heat Ex.2080-Dr.Allen, ¶54; POSR, pp. 9, 35

Kit's 28W is speculative: no evidence of cover or housing or LED quality
Ex.1004-Kit, 6:25-27 ("should consume 28 watts"); Ex.2080-Dr.Allen, ¶s 74-86 (esp. 74-75); POSR, pp.35-36

No basis: Durosite-17W; Katzir-14W LED quality; Mac Tech-only 10W
Ex. 1001, 2:47-50 ("17 Watts"); Ex.1006, [0026]("14 watts");
Ex. 2047-Fisher.Depo. @113:21-25; POSR, p. 36; POR, p. 63

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

SOLUTION – SOME THINGS MACIAS DID

-Got an LED driver to push the chips	Ex. 1047-Macias.Depo., @240:21-23
-Applied 42 watts	Ex. 1001, 10:27 (Example 1)
-Experienced "barrels of failures"	Ex. 1047-Macias.Depo., @100:8-14
-Including "thermal failures"	Ex. 2068-Macias.Decl., ¶9
-Made "many trips to China"	Ex. 2068-Macias.Decl., ¶9
-Solved green issues and lumen penalties	Ex. 1047-Macias.Depo., @115:3-12, 239:2-24
-Used 576 LEDs	Ex. 1001, 10:39 (Example 1)
-Individually tested LEDs qualities	Ex. 2123-Provisional, p.5,Lns 4-6 (PDF@8)

POSR, pp. 1, 10-11, 25, 27, 35-36

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

PROBLEM, SOLUTION, CLAIM 1

CLAIM 1 (Ex. 1001)

1. An LED light system configured for providing broad-spectrum white light suitable for a commercial image recording, in a form factor of a fluorescent light tube lamp, the LED light system comprising:

a. a housing having ends and including a support structure in a form of an elongated and narrow surface having a top side and a bottom side;

b. a plurality of first LEDs mounted on the top side of the support structure and configured to emit broad-spectrum white light in a first predetermined Kelvin temperature range of cool white light;

c. a plurality of second LEDs mounted on the top side of the support structure and configured to emit broad-spectrum white light in a second predetermined Kelvin temperature range of warm white light;

d. electronic circuitry mounted to the support structure including an LED driver circuit configured for selectively electronically switching between driving either (i) the first LEDs, to provide light while the second LEDs are off; or (ii) the second LEDs, to provide light while the first LEDs are off, wherein the first and second predetermined Kelvin temperature ranges are nonoverlapping, and including a printed circuit board mounted to the support structure for carrying electrical power from a connection to the LED driver circuit and then to the first and second LEDs; and

e. an elongate cover extending substantially a length of the support structure and covering the top side of the support structure for diffusing light emitted by the first and second LEDs; and

f. wherein the housing and cover together have a linear form factor of a fluorescent light tube lamp having a diameter of no greater than approximately 41 mm,

g. wherein the LED light system is configured for receiving input power to be provided to the LED driver circuit to selectively light the first or second LEDs, and

h. wherein the first and second LEDs are disposed in a plurality of rows distributed along the length of the top side of the support structure to emit light, when selectively lit by the LED driver circuit, along the length of the top side of the support structure,

i. wherein the light is diffused by the cover and is suitable for the commercial image recording both when the emitted light from the LED light system is in the first temperature range of cool white light and when the emitted light from the LED light system is in the second temperature range of warm white light,

j. wherein the light emitted from the LED light system is said suitable for the commercial image recording when said emitted light:

(i) is at least 1000 lumens when the first LEDs are lit and is also at least 1000 lumens when the second LEDs are lit;

(ii) is broad-spectrum white light having a color deviation corresponding to less than five points of green and less than five points of magenta (5M, 5G) of color compensation (CC), and

(iii) has a color rendering index of light emitted from each of the first LEDs or each of the second LEDs, whichever respective plurality of first or second LEDs is lit, that is greater than 90.

Patent Owner's DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

Exhibit 2127
Colt International
IPR2023-00614