UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

QUASAR SCIENCE LLC
Petitioner,

v.

COLT INTERNATIONAL CLOTHING, INC. d/b/a COLT LED
Patent Owner.

Case: IPR2023-00613
U.S. Patent No. 10,411,582

PATENT OWNER'S SUR-REPLY TO PETITIONER'S RESPONSE

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PATENT OWNER'S SECOND UPDATED EXHIBIT LIST

Exhibit No.	Exhibit Description
2001	U.S. Patent No. 9,845,924 to Macias ("'924 Patent") ("Parent, '924 Patent")
2002	U.S. Patent No. 9,719,642 to Macias ("'642 Patent") ("Grandparent, '642 Patent")
2003	U.S. Patent Publication No. 2007/0228999 to Kit ("Kit '999")
2004	U.S. Patent Publication No. 2007/0258240 to Ducharme ("Ducharme '240")
2005	U.S. Patent Publication No. 2011/0043137 to Negley ("Negley")
2006	"Whiter, Brighter LEDs," by Keeping, Steven, Electronics Products Magazine, Oct. 30, 2011 ("2011 Keeping Article")
2007	U.S. Patent Publication No. 2003/0072156 to Pohlert et al. ("Pohlert")
2008	First Official Action dated October 17, 2018 in reexamination for U.S. Patent No. 9,719,642, Reexam Control No. 90/014,146 ("First Reexam of '642 Patent")
2009	Ex Parte Reexamination Certificate (11548th), July 29, 2019 to Macias on US Patent No. 9,719,642 ("First '642 Reexam Certificate")
2010	Ex Parte Reexamination Certificate (11513th), May 17, 2019 to Macias on US Patent No. 9,845,924 ("First '924 Reexam Certificate")
2011	Ex Parte Reexamination Certificate (11858th), June 7, 2021 to Macias on US Patent No. 9,719,642 ("Second '642 Reexam Certificate")
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2014	Office Action dated October 17, 2018, Reexamination Control No. 90/014,146
2015	Office Action dated November 21, 2018, Reexamination Control No. 90/014,150

2016	Notice of Intent to Issue Reexamination Certificate, Reexamination Control No. 90/014,150, dated April 2, 2019 ("NIIRC '150")
2017	Office Action dated Feb. 23, 2021, Reexamination Control No. 90/014,372 ("Second Reexam of '924 Patent")
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2053	Claim Chart showing selected '582 Patent Claims vs. Colt's Bicolor LED Tubular Lights ("Claim Chart '582 Patent vs Colt Bicolor")

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2060	Various Photos of Quasar's Crossfade product, four-foot length ("Crossfade Photos")
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2123	Provisional Application No. 61/648,554 filed May 17, 2012 ("Macias Provisional")
2124	Corrected Official Filing Receipt for Serial No. 61/648,554, mailed 06/04/2012 ("Provisional Filing Receipt")
2125	Emails of March 15 and 18, 2024 with Board Granting Request to Expunge and Submit Correct Exhibit 2094
2126	Emails of February 16, 2024 and March 27, 2024 from David Hoffman to Ken Fisher re retention

2127	February 16, 2024 Expert Consulting Agreement with Ken Fisher

I. INTRODUCTION

The individual elements in claim 1 were known, **but not in combination.**

Trying to maximize every light output parameter to achieve claim 1's bicolor (1[b]-[d]) with 1000+ lumens each color (1[j]/[j](i)), with G/M<5, CRI>90 (1[j](ii)-(iii)), and housing with diffusion cover forming a fluorescent form factor ("FFF/T-12") (1[a], [e]-[f]), was a path to failure by overheating the LEDs' P/N junction, thereby destroying light quality critical for commercial image recording ("Film/TV") (1[pre], 1[j]). The 1000+ lumens (§II) for a Film/TV quality tube in 2013 required extremely high power loading, well-exceeding sound limits, leading to thermal issues (§III).

Petitioner's Reply's introduction is misleading. There is no concession that the only issue is 1000+ lumens. And, claim elements 1[j]/1[j](i) require 1000+ lumens emitted from **the light system** in **both warm and cool white modes**.

Dependent claims 12-13, 29-30 emphasize high power loading (≥42 watts), well exceeding the art for FFF/T-12 with housing and cover.

Though not needed, secondary considerations, especially aggregated, are substantial.

II. PETITIONER FAILED TO REACH 1000+ LUMENS FOR THE INVENTION AS A WHOLE

A. Ground 2 Does Not Reach 1000+ Lumens for Warm and Cool Modes

Petitioner argues Ground 2 (Ducharme, Ianiro, Katzir and Hasnain), achieves 1000+ lumens by calculating LED rated lumens per watt (LPW) for luminaire output, and downplays or argues inapplicability of losses. Reply, §II.A., pp.2-3; Ex.1049-Holmes.Supp., ¶s 22-27.

But Petitioner has not shown a POSITA, considering losses, would have a reasonable expectation of success in designing a bicolor luminaire (1[b]-[d]) with all claim 1 elements, including 1000+ lumens for warm white and for cool white (1[j]/[j](i)), G/M<5 and CRI>90 (1[j](ii)-(iii)), and a housing and diffusion cover forming a FFF/T-12 (1[a],[e]-[f]).

1. Petitioner's/Holmes' speculative lumen calculations

Petitioner's Expert/Attorney Holmes cites Hasnain's LED light for replacing fluorescent's 70-100 lumens per inch ("Lm/in"). Ex.1049-Holmes.Supp., ¶22. But this is "**conventional** incandescent or fluorescent light…." Ex.1008-Hasnain-C1:Ls.6-10 (emphasis added); not TV/film quality.

To match fluorescent, Hasnain wants 0.9 watts per inch ("W/in") with 70-100 LPW. Ex.1008-Hasnain-C3:L63-C4:L3. **But Hasnain's LED's G/M bias and CRI are unknown. Any luminaire lumen calculations are speculative** and

inapplicable, failing to satisfy 1[j](ii)-(iii). Ex.2080-Dr.Allen, pp.18-19 (¶s 28-29). A POSITA cannot just design at Hasnain's 70-100 LPW **and assume the LEDs are** GM<5 and CRI>90. **Petitioner never provides evidence of Hasnain's LEDs' qualities.** Petitioner just asserts a POSITA would order them. But 2013 binning wasn't that specific. Ex.2080-Dr.Allen, ¶73.

More important, Petitioner's lumen outputs (Ex.1049-Holmes.Supp., ¶s 22-27 and all other Petitioner lumen calculations) omit various lumen losses resulting from using/converting to LED qualities **GM<5 and CRI>90** (1[j](ii)-(iii)) instead of lesser, conventional quality, and for a diffusion cover (1[e]). §II.A.3-below (other omitted losses discussed).

2. '582 Patent testing is net of lumen losses

Petitioner argues the '582 Patent does not mention losses so they don't apply to Petitioner. Reply, p.3, citing Ex.1049-Holmes.Supp., ¶s 22-27.

This conclusory illogic improperly injects enablement (viewing '582 disclosure) and hindsight into obviousness. Enablement is outside IPR scope. 35 U.S.C. §311(b).[1] Inventors need not know or set forth how or why the invention

[1] Petitioner argues a POSITA, armed with the '582 disclosure, could create the '582 luminaire. But: "Defining the problem in terms of its solution reveals

works. *Newman v. Quigg*, 877 F.2d 1575, 1581 (Fed.Cir. 1989).

Merely because the '582 Patent does not mention losses does not mean Petitioner can ignore them.

Additionally, '582 Claim 1[j]/[j](i) recites 1000+ lumen output for a bicolor **luminaire ("light system") meeting all claim elements**, including GM<5; CRI>90 with a housing and diffusion cover forming a FFF/T-12. Claim 1's luminaire output is **after experiencing losses**, because element 1[j] recites output from "light emitted from the LED light system." This is equally true of '582 Patent Examples 1-3 constructing (with cover**)** then testing the luminaire: "A four foot long T12…LED lamp was constructed…." Ex.1001-C10:Ls.9-10, 48-49; C11:Ls.18-19. The lamp has a "diffusing shade cover 24." Ex.1001-C6:Ls.31-33, Fig.2.

3. Petitioner's/Holmes' lumen calculations omit losses

Petitioner/Holmes argue Hasnain's 70-100 LPW is luminaire output. Petitioner/Holmes propose two 22W versions: 22Wx70 LPW=1540 lumens; and 22Wx100 LPW=2200 lumens. Reply, pp. 4-5, Ex.1049-Holmes.Supp., ¶23. To

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improper hindsight …." *Monarch Knitting Mach. Corp. v. Sulzer Morat Gmbh*, 139 F.3d 877, 881 (Fed.Cir. 1998).

support 70-100 LPW Petitioner submits an LED datasheet. Ex.1062-datasheet; Ex.1049-Holmes.Supp., ¶54.

(i) Hasnain's 70-100 LPW is LED output, not luminaire

Contrary to Holmes' assertions (Ex.1049-Holmes.Supp., ¶s 53-54), Hasnain's 70-100 LPW is for LEDs, not luminaire output. Hasnain says: "white light sources based on GaN blue emitting LEDs generate 70 to 100 lumens per watt." Ex.1008-Hasnain-C3:L63-C4:L3. Referring to **Petitioner's** datasheet, **cool white (5000K)** LEDs yield 75 LPW at CRI=90 and 100 LPW at CRI=65. Ex.1062, p.1-specifications, below:

Part No.	Chip Structure	Emitting Color	Color Rending Index (Ra)	Absolute Maximum Ratings (Ta=25°C)					Electrical and Optical Characteristics (Ta=25°C)								
				Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} (mA)	Operating Temperature Topr(°C)	Storage Temperature Tstg(°C)	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								(0.437, 0.404)		5.4	8.5		31		78
PSL0102WBFC			90											7		25		63
PSL0102WBFD			75										8.2	10.6		37		93

EXCERPTED FROM EX. 1062 (p.1)

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

Ex.1062, p.1-annotated/excerpted.

Hasnain's light is just LEDs on a board, insultation 33 and heat-dissipating structure 36. Ex.1008-Hasnain-C3:Ls.47-52; Ex.2080-Dr.Allen, ¶s 20, 48-50 (Hasnain: no cover, no housing; just "bare LEDs"); §II.A.8-below (same). Accordingly, Hasnain does not consider diffusion losses, CRI or green bias, or warm white's lower output. Since the datasheet's 75-100 LPW for cool white

essentially matches Hasnain's 70-100 LPW, Hasnain is using existing cool white LPW as device output. Ex.1062, p.1-chart (cool white 75-100 LPW).

(ii) Lumen calculations must use the lower, warm white specs

Since claim 1 recites 1000+ lumens for both cool and warm whites, the lower **warm white (3000K)** LPW specifications at CRI=90 yielding **63 LPW** should be used:

Part No.	Chip Structure	Emitting Color	Color Rending Index (Ra)	Absolute Maximum Ratings (Ta=25°C)					Electrical and Optical Characteristics (Ta=25°C)									
				Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} (mA)	Operating Temperature Topr (°C)	Storage Temperature Tstg (°C)	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			65										8.2	10.6		37		93
PSL0102WBFB		White (3,000K)	80								(0.437, 0.404)		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.1062, p.1-annotated/excerpted.

(iii) Calculations for Holmes 22W proposals

Using Dr. Allen's 15% minimum lumen penalty for improving green bias

(since the datasheet bias is unspecified) (Ex.2080-Dr.Allen, ¶s 26-27),[2] 67% best luminaire efficiency factor from LED LPW to luminaire output (Ex.2080-Dr.Allen, ¶s 78-80), and Holmes' proposed 22W with warm white CRI=90 LEDs (63 LPW from Ex.1062), luminaire output is only 789 lumens:

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**
22	63	22x63= 1386	1386x0.15=208	1386-208= 1178	1178x0.67= **789 Lumens**

Petitioner/Holmes also propose (22W)x(**100 LPW)**=2200 lumens. Ex.1049-Holmes.Supp., ¶s 23, 57-58. However, 100 LPW is inapplicable since it is for **cool white at CRI=65** (Ex.1062, p.1) and G/M unknown, so this proposal fails to meet claim 1[j](iii)(CRI>90), 1[j](ii)(G/M<5). [redacted]

[redacted]

[redacted] This sentence withdrawn by Patent Owner.

[2] 15% loss for green bias improvement is reasonable since it is **Petitioner's burden** to show bias/CRI of Hasnain's LEDs and **complete** calculations for luminaire output.

[redacted]

Petitioner argues losses are routinely handled but fails to show complete calculations and specifications for such.

4. Applying losses to Durosite

Petitioner argues Durosite was 1500 lumens (17W). Reply, p.4; Ex.1049-Holmes.Supp. ¶s 24-25, 56, but presents no evidence of G/M bias, CRI or diffusion cover. Even assuming Durosite had reasonably good conventional LEDs (CRI=80; G/M=20), loss is 35%. (Ex.2080-Dr.Allen, pp. 16-22 (¶s 24-31)). Minimum diffusion cover losses are another 20% (Ex.1039-Dr.Allen.Depo., @54:2-6; 53:25-54; 51:4-20). Starting with 1450 lumens **for warm white** (Ex.2123, PDF@5; Ex.1049, ¶25), then accounting for these losses, light output is (1-.35)x(1-.20)x(1450 lumens)=**754 lumens**.

The same speculative LED qualities and ignored losses apply to all Petitioner's proposals/devices, including Exhibits 1033-1037. Ex.1049-Holmes.Supp. ¶26.

5. Holmes' proposed 44W is inapplicable

Holmes' proposes 44W luminaires yielding 3080 and 4400 lumens.

Ex.1049-Holmes-Supp. ¶s 23, 57-59. But going from 22W to 44W doubles power loading thus doubling heat. Ex.2080-Dr.Allen, ¶54 (linear relationship between power loading and heat); (§III-below (thermal issues); §VI-below (42W claims)(POSITA would not use 42W, particularly for Film/TV for fear of damaging LED quality.)

6. Holmes' mischaracterizes lumen losses and Hasnain's output

(i) Selecting better LEDs means losing lumens

Petitioner argues '582 Patent LED testing means there are no losses and/or a POSITA just picks better LEDs. Reply, pp. 5-6; citing Ex.1049-Holmes.Supp. ¶s 50-54.[3] But this approach uses hindsight. (§A.2-above.) Moreover, to improve CRI and green bias lumen penalties cannot be avoided: LPW decreases with increasing CRI and LPW decreases with decreasing green bias. Ex.2080-Dr.Allen, pp. 17-19, (¶s 26-30).

Petitioner's datasheet confirms losses going from one given LED quality to another. For warm white LEDs (3000K), CRI=65 yields 93 LPW. Ex.1062, p.1-chart. For the same warm white LEDs, to get CRI=90, **LPW drops over 30%** to

[3] That Patent Owner didn't depose Holmes is irrelevant. Dr. Allen's testimony was sufficient on losses. Ex.2080-Dr.Allen, pp. 13-23, 57 (¶s 23-33, 80).

63. *Id.* Likewise, losses occur for green bias. Ex.2080-Dr.Allen, ¶s 26-27 (≥15% loss).

(ii) Ordering LEDs and binning

Petitioner argues constructing the claimed luminaire just meant ordering better LEDs. Reply, pp. 16-17, citing Ex.1039-Dr.Allen.Depo. @90:16-23. But in 2013, there were no bins for CRI>90 and green bias less than five McAdam steps (G/M<5); bins were 7-steps for cool and warm white. Ex.2080-Dr.Allen, ¶73. Holmes binning discussion was **not** correct. Ex.2080-Dr.Allen, ¶s 70-73. In addition to contending with losses, a POSITA could not simply order LEDs satisfying 1[j](ii)-(iii).

(iii) Macias/'582 selection and one-by-one testing LEDs

Petitioner argues Macias just tested and selected LEDs. Reply, pp. 5-6. Macias' "selection" was **after** ordering and receiving LEDs:

> [B]ecause LED manufacturing quality varies greatly, LEDs are first tested and then placed in the array if they meet the specifications sufficient to produce sufficient light from each color light type….

Ex.2123-provisional p.5, Ls.4-6 (PDF@8).

Macias got an LED driver to "push the chips" (Ex.1047-Macias.Depo.,

@240:21-23) to increase power dramatically (42W). Ex.1001-C10:L27. He "took many trips to China to overcome thermal failures." Ex.2068-Macias, ¶9. He overcame issues with too much green and lumen penalties, (Ex.1047-Macias.Depo., @115:3-12, 239:2-24), had "many barrels of failures" and finally succeeded.[4] *Id.*@100:8-14.

(iv) Quantifying lumen penalties for green bias

Holmes critiques Dr. Allen for mentioning filters. Ex.1049-Holmes.Supp., ¶51, referencing Ex.2080-Dr.Allen, ¶s 26-27. Lumen penalties/losses just equal the lumen loss that would be experienced using a filter to improve G/M bias to G/M<5 from whatever the LED's green bias actually is. Ex.2080-Dr.Allen, ¶s 26-27.

Petitioner/Holmes contend properly designed fixtures have no current droop. Ex.1049-Holmes-Supp. ¶52. But thermal droop occurs to get claim 1's elements because LED junction temperatures are pushed. (§III.A.4.-below; also fn.5-thermal droop: 15% loss); Ex.2080-Dr.Allen, ¶s 21-23, 42, 78.

[4] The manner of invention does not negative patentability. 35 U.S.C. §103. "[I]t is immaterial whether it resulted from long **toil and experimentation** or from a flash of genius." *In re Merck & Co., Inc.*, 800 F.2d 1091, 1099-1100 (Fed.Cir. 1986)(quoting reviser's note)(emphasis added).

7. Diffusion cover 20% loss

Petitioner argues Hasnain's 70-100 LPW is net of losses. Reply, p.6; Ex.1049-Holmes.Supp. ¶53. But Hasnain's 70-100 LPW is for LEDs, before losses. (§II.A.3(i)-above.)

Petitioner argues the '582 Patent allows for clear diffusion covers. Reply, p.6; Ex.1049-Holmes.Supp. ¶54. But, for diffusion, whether clear or not, there is at least 20% loss:

> …typically these diffusing plastics were 30 and 40 percent absorbing output….We [at GE Lighting] pushed the technology to be **20 percent** absorbing. That is **the best** … at this time.

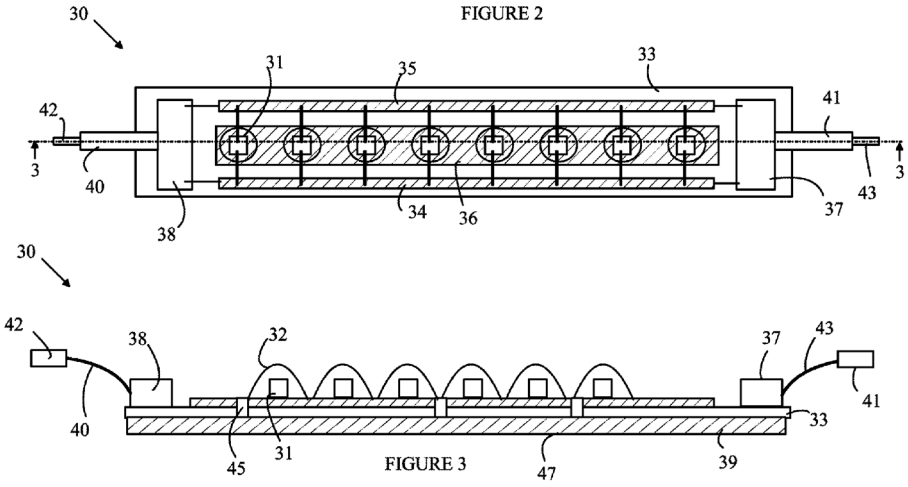
Ex.1039-Dr.Allen.Depo., @51:4-8 (emphasis added); @50:8-51:20 (generally).

Dr. Allen explains the '582 Patent's reference to clear diffusers (Ex.1001-C6:Ls.31-33): "…this patent spec [teaches] that [a] **diffuser shade needs to diffuse the light**." Ex.1039-Dr.Allen.Depo., @52:25-53-2 (emphasis added). A clear cover, e.g., a "diffraction grating" can diffuse. *Id.*@53:3-12.

8. Hasnain has no cover or housing

Hasnain is an open-air design: no cover or housing. Ex.1008-Hasnain-C3:Ls.51-53 ("ambient environment" cooling); C5:Ls.65-67 ("heat-radiating surface…dissipates the heat to the surrounding air…"); Ex.2080-Dr.Allen, ¶s 48-50 (open-air). There is no cover, no housing and no FFF/T-12. Ex.1008-Hasnain-

C3:L36-C4:L58, Figs.2-3 (below-no cover, no housing).



Ex.1008-Hasnain, Figs.2-3. (Figs. 4-5 have no cover, no housing too. §III.B.1-below).

B. Ground 1 Is Not 1000+ Lumens

Petitioner argues Ground 1 (Kit, Ducharme, Ianiro and Katzir) yields 1200 or 1040 lumens. Reply, §II.B., pp.6-7. But Petitioner fails to explain how to translate Kit's mono-color to bicolor yet maintain lumens.

Moreover, Kit's 1040 lumen/Cree-based light and hypothetical 1200 lumens were addressed by Dr. Allen. Ex.2080-Dr.Allen, ¶s 75-78 (well under 1000 after losses). These versions are inapplicable because green bias is speculative and for the hypothetical 1200 lumen version CRI is too.

Dr. Allen explained shortcomings of Petitioner's hypothetical Katzir/K2 device. Ex.2080-Dr.Allen, ¶s 81-86 (e.g., Katzir proposes 14W requiring unattainable 221 LPW; Ex.1006-Katzir [0026]; no G/M bias or CRI thus speculative and/or 35%+ loss).

Petitioner's/Holmes' asserted 42W input is conclusory. A POSITA would not use that amount. (§III.A.4-below (thermal limitations); §VI-below (42W claims: extreme)).

III. THERMAL ISSUES PRECLUDE REASONABLE EXPECTATION OF SUCCESS

Petitioner argues thermal issues are routine because unmentioned in the '582 Patent. Reply, §III, pp.7-8. This is improper hindsight. (§II.A.2-above.)

A. Hasnain's Teachings Are Incompatible with Ducharme

Petitioner argues reliance just on Hasnain's 70-100 LPW and "additional heat-dissipating surface on the backside of the light source…to dissipate more heat…." Reply, p.9, Ls.1-7.

1. A POSITA cannot use Hasnain's 0.9 W/in in Ducharme's covered, housed device

Petitioner's Ground 2 uses Ducharme's cover 5003 and housing 5001 (Ex.1005-Ducharme-C12:Ls.49-53, Fig.5a). Reply, p.9, Ls.1-4. But Petitioner

cannot rely on Hasnain's 70-100 Lm/in requiring **0.9 W/in** (Ex.1008-Hasnain-C3:L61-C4:L3) otherwise the proposed device is way overheated at the LEDs' P-N junctions. Ex.2080-Dr.Allen, ¶s 40-62. Per conventional design principles this leads to irreparable damage. *Id.*, ¶s 60-61. A POSITA would have no motivation to combine and no reasonable expectation of success. *Id.*, ¶s41, 60-61.

Petitioner's proposed 44W (greater than Hasnain's 0.9W/in x 44" usable length) requires Hasnain's "heat-dissipation techniques" which cannot be applied in Ducharme's **housed and covered device**. Hasnain's embodiments are all **coverless and unhoused for airflow**. A POSITA would not simply apply Hasnain's wattage to Ducharme to get Petitioner's proposed lumens because the wattage requires Hasnain's **open-air device**. (§II.A.8-above; §III.B.1-below).; Ex.2080-Dr.Allen, ¶s 48-50 (Hasnain's open-air).

2. Hasnain's 70-100 LPW LED's G/M bias and CRI are unknown thus unusable by a POSITA

Petitioner proposes using Hasnain's 70-100 LPW. Reply, p.9, Ls.1-7. But, Hasnain's 70-100 LPW uses LEDs with **unspecified G/M bias and CRI**, so there is no motivation to combine or reasonable expectation of success to achieve 1[j](ii)-(iii). (§II.A.1.-above (speculative G/M, CRI)).

3. Hasnain's heat-dissipation will not work with Ducharme's housing and cover

Petitioner argues that a POSITA could take Hasnain's "additional heat-dissipating surface [47]" and modify Ducharme to use higher wattage. Reply, p.9, Ls.1-7. But '582 Claim 1 includes the housing, cover and FFF/T-12 formed thereby. Ex.1001-claim 1, 1[a], 1[e]-[f]. Placing surface 47 inside a covered, housed device **defeats heat-dissipation** per Dr. Allen and common sense:

> In a tube LED lamp, both of those spreaders [elements 36, 47] will be enclosed in the cover and housing. So we are just making the air inside the tube hotter…. We are not getting the heat out of the tube.

Ex.1039-Dr.Allen.Depo., @97:13-17; also, @96:22-97:19. Figs. 4-5 require rigid attachment to the troffer wall and would not work due to the troffer's limiting conductance; a POSITA would not use such extreme measures. Ex.2080-Dr.Allen, ¶s 66-68.

Putting surface 47 and/or structure 59 outside any housing and cover would ruin the FFF/T-12, especially where in contact with troffer wall 25. It is unclear how structures 47,59 would be installed or work with FFF/T-12. Ex.1008-Hasnain-C5:Ls.3-5 (structure 59 contacts wall 25).

4. Critical thermal limitations

Petitioner downplays thermal issues. Reply, p.8-top. But leading LED manufacturer Cree's Design Guide recommends maximum LED junction temperature (T_j) be **80ºC**. Ex.2080-Dr.Allen, ¶44; Ex.2083-Guide, p.8-bottom[5]. While higher junction temperatures may be possible, a POSITA would not risk damaging critical CRI and G/M bias, and other qualities for Film/TV. Ex.2080-Dr.Allen, ¶s44-61, esp., ¶s 44, 59-61.

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-Report, p.19-near bottom (75ºC to 85ºC and 75% to 85% humidity, **at just 5ºC above Cree's recommended T_{jMAX}=80ºC**); Ex.2080-Dr.Allen, ¶s 59-61 (disastrous effects of overheating on color, photometrics, chromaticity). Therefore, a POSITA would design at or below Cree's 80ºC, especially for Film/TV. Ex.2080-Dr.Allen, ¶s 35-44 (¶44 end: "[A] POSITA would certainly not want to go above Cree Design Guide's recommended p-n junction 80ºC limit.") (§III.A.4-above). This precludes achieving claim 1, even using Hasnain. Ex.2080-Dr.Allen, ¶s 35-68 (thermal analysis).

Substantial heat issues circa 2013 are well-confirmed. The Set Lighting

[5] Note significant, 15% thermal droop at 80ºC vs. 25 ºC. Ex.2083, p.8-chart.

Technician's Handbook references "[t]he **lethal effect of overheating.**" Ex.2046-Handbook, p.248 (PDF@270)(2nd paragraph)(emphasis added).

Hasnain avoids **tube form factor**: "Since these replacements have the same form factor as the fluorescent tubes…, **heat dissipation presents challenges**…." Ex.1008-Hasnain-C3:Ls.20-23 (emphasis added).

Even assuming a POSITA sought bicolor (1[b]-[d]) with housing and diffusion cover in FFF/T-12 (1[a], 1[e]-1[f]), 1000+ lumens per bicolor mode, G/M<5, CRI=90 ([j](i)-(iii)) for Film/TV, such POSITA would not have a reasonable expectation of success since it required at least 0.9 W/in, extremely high for a **housed, covered luminaire**.

While Hasnain is in Ground 2, the same analysis dooms Ground 1 to likely thermal failure due to the same $T_{jMAX=}$ 80ºC limit.

5. Individually known elements

Petitioner argues individually known elements. Reply, pp.9-10, citing Ex.1049-Holmes.Supp., ¶s 7-27. But claims must be evaluated as a whole. 35 U.S.C. §103; *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1537 (Fed.Cir. 1983).[6] (§II.A.2.-above (hindsight).)

[6] See also, §II.A.3.-A.4.; §III.B.; §IV.A.

B. Substantial Well Known Thermal Concerns Reinforce Likely Failure

Petitioner argues thermal concerns were readily handled. Reply, §III.B., p.10. But a POSITA had to avoid significant thermal degradation, especially for Film/TV, further explained below. (Also, §III.A.4.-above).

1. Dr. Allen's[7] analysis is not faulty

Petitioner argues Dr. Allen overlooked Hasnain's heat dissipation. Reply, §III.B., p.10-middle; Ex.1049-Holmes.Supp., ¶s 41-49, citing Ex.2080-Dr.Allen, ¶s 35-62. But Dr. Allen considered it and explained its insufficiency. Ex.1039-Dr.Allen.Depo., @95:7-21; @96:11-97:19 (if Hasnain's spreader/heat-dissipating surface is covered it won't work). Dr. Allen discusses Holmes (Ex.1003-Holmes, ¶490) and Hasnain's spreader/heat-dissipating surface 47. Ex.2080-Dr.Allen, ¶s39-40, 66-68 (discussing Hasnain's Fig.4, "surface 47"); Ex.1039-Dr.Allen.Depo.,

[7] Petitioner argues (Reply, p.10, fn.4) that Patent Owner's POSITA definition excludes Dr. Allen. But experts need not exactly match the invention's field. *Westinghouse Air Brake Techs. Corp. v. Siemens Mobility, Inc.*, IPR2017-01454, Paper 33 at 36-39 (PTAB Dec. 6, 2018). Dr. Allen meets Petitioner's definition. Ex.1039-Dr.Allen.Depo. @43:10-21; @44:1-10 (EE or equivalent); @44:11-21 (two years' experience designing LED lighting including for Film/TV).

@97:4-19; (also, §III.A.3.-above).

Petitioner/Holmes argues Dr. Allen's analysis was faulty because '582 Examples 2-3 testing is allegedly without a cover: "The LEDs are tested to provide the desired light…about 1000 lumens or more, and purity of color." Ex.1049-Holmes.Supp., ¶43, citing Ex.1001-C11:39-44. But this sentence does not mean Macias tested a coverless luminaire or just LEDs for 1000 lumens.

In responding to the question: "But we have at least 1,000 lumens based on the LEDs alone, no cover, right?", Dr. Allen stated: "…all of the limitations that go into this lamp…for which he has to choose the individual LEDs in order to get 1,000 lumens out of the limitations…." Ex.1039-Dr.Allen.Depo., @86:15-24. Dr. Allen's interpretation makes sense since each LED is not producing 1000 lumens.

Moreover, a constructed device is tested per the '582 disclosure (and claims), because output (1000 lumens) is from a luminaire with diffusion cover. Both Examples 2-3 are over 1000 lumens. Ex.1001-C10:L66, C11:31-32; §II.A.2 (explains '582 Patent's **luminaire** testing); §II.A.6(iii)(explains '582 Patent's **pre-luminaire** selection/testing **of LEDs**).

Holmes argues Hasnain teaches an optional cover. Ex.1003-Holmes, ¶490; Ex.1049-Holmes.Supp., ¶s 44-49, esp., ¶45. The alleged "cover" is just a "lens mounted above": "[C]ylindrical lens 61 is mounted **above** the LEDs." Ex.1008-Hasnain-C6:Ls.57-60, Fig.5 (emphasis added). Petitioner's conclusory assertions

have not shown the lens is a "cover" that together with a "housing" makes an **FFF/T-12 per elements 1[e]-[f]**. Hasnain's Fig.4 has no cover or housing:

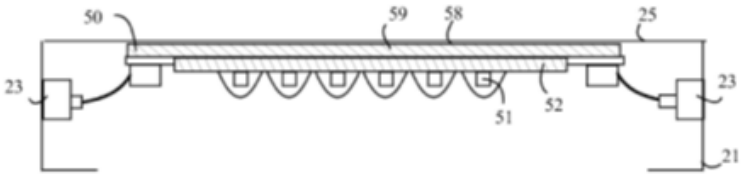


FIGURE 4

Ex.2008-Hasnain, Fig.4.

Hasnain's Fig.5 also does not have a cover otherwise airflow is blocked. The lens 61 is supported above the LEDs, but there is no indication of closing off airflow. Ex.2008-Hasnain-C6:Ls.48-60.

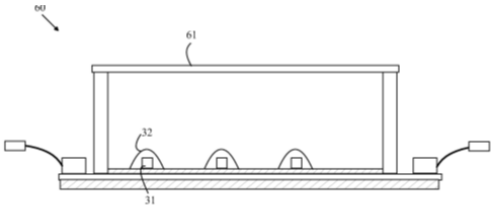


FIGURE 5

Ex.2008-Hasnain, Fig.5. Moreover, even if there were a cover, there is no housing and **no FFF/T-12**.

Holmes asserts (conclusory, without calculations or data) Ducharme's Fig.5A (below) air slots (in lower body 5001) provide cooling. Ex.1049-Holmes.Supp., ¶48. Such air slots obviously have substantially less airflow compared to Hasnain's "no cover, no housing" design. Dr. Allen confirms: Air slots are "an order of magnitude less effective than good thermal management. I do

not want to leave you with the impression that is thermal management. It is not."

Ex.1039-Dr.Allen.Depo., @107:4-9 (also @105:4-107:9).

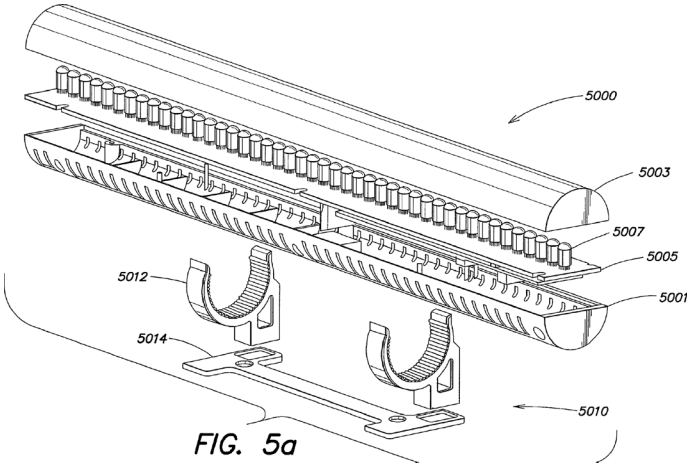


FIG. 5a

Ex.1005-Ducharme, Fig.5a.

2. Lack of known thermal failure is not relevant

Petitioner argues Baxter was unaware of bicolor thermal failures. Reply, p.10. But Baxter left the industry shortly after Colt's Bicolor introduction. He had limited experience, if any. Ex.2068-Macias, ¶20 (introduction October 2013); Ex.2047-Baxter, p.25 (Litepanels stint ended July 2014).

Petitioner argues Wonderlick hadn't seen thermal issues with Mac Tech. Reply, p.11. But Mac Tech was only 10W. (§IV.A.2.-below.)

IV. NO MOTIVATION TO COMBINE AND NO REASONABLE EXPECTATION OF SUCCESS

Petitioner argues "the web of design issues" are just well-known issues

unmentioned in the '582 Patent. Reply, p.11. (But see, §II.A.2 (improper hindsight); §III (thermal issues)).

A. All Elements Separately Known Is True of Every Invention

Petitioner argues all individual elements were well-known. Reply, §IV.A., pp.11-15. That's true of most if not all inventions and ignores the invention as a whole.

1. Technical capability is not obviousness

Petitioner cites Baxter's statement that Litepanels had the technical ability to make a bicolor tube. Reply, p.12. Whether another company **could** have made the claimed device is not obviousness. *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed.Cir. 2015). Litepanels found trying to make LED tubes too risky. Ex.2047-Baxter, ¶s27, 57-58, 73-80 (supported by ¶s 28-72). Baxter personally considered failure likely and concludes a POSITA would conclude the same. *Id.*, ¶s 73-75.

2. Mac Tech's mono-color LED tube was only 10 watts

Petitioner mentions Mac Tech's tubes for Film/TV. Reply, p.13. But it was mono-color, in reality had too much green and was **only 10 watts**. Ex.1043-Fisher, @113:21-25 ("Mac Tech at the time were nine to ten watts…."). Even assuming

63 LPW LEDs Mac Tech yielded only 630 lumens (63x10) before losses.

3. Petitioner again argues routine design, known elements, mere selection mischaracterizing '582 selection/testing

Petitioner/Holmes argues color purity and testing/selection were known. Reply, pp.14-15; Ex.1049-Holmes.Supp., ¶s 28-31. (But see, §II.A.2. ('582 examples testing constructed device); §II.A.6(iii) ('582 selection/testing LEDs); §III.B.1 (Dr. Allen on '582 selection/testing)).

Holmes quotes Dr. Allen: "[a] POSITA would not have a reasonable expectation of success without knowing the photometric and chromaticity specifications of the LEDs" and asserts it proves the **inverse**. Ex.1049-Holmes.Supp., ¶30 (quoting Ex.2080-Dr.Allen, ¶31). That is false logic and conclusory attorney argument. Dr. Allen's paragraph 31 explained a POSITA cannot assume G/M<5 and CRI>90, therefore Hasnain's 70-100 LPW is inapplicable. Ex.2080-Dr.Allen, pp.21-22 (¶s 30-31).

B. Petitioner Did Not Establish Motivation to Combine and Reasonable Expectation of Success

Petitioner/Holmes make several conclusory, hindsight-based attorney arguments using improper interpretation of '582 Patent and testimony. Reply, §IV.B., pp.15-17; Ex.1049-Holmes.Supp., ¶s 33-40.

Petitioner/Holmes argue heat is trivial, citing Dr. Allen's testimony regarding enablement. Reply, §IV.B., pp.15-17; Ex.1049-Holmes.Supp., ¶s 34,37, citing Ex.1039-Dr.Allen.Depo., @88:18-90:23 ('582's LED selection and aluminum housing as part of heat management).

Holmes misinterprets Dr. Allen's testimony, which as a whole was a POSITA armed with the '582 specification (hindsight), seeing an aluminum housing, large number of LEDs (576), 40,000 hour life, and one-by-one testing/selection, would be able to solve thermal issues and reproduce the claimed invention. Ex.1039-Dr.Allen.Depo., @88:18-90:23 (aluminum housing; 40,000 hours), @128:15-24 (576 LEDs), @86:2-24 ('582 LED testing with luminaire goal of 1000 lumens in mind). Also, §II.A.2-above and fn.1 (improper hindsight).

Holmes argues Dr. Allen confirms routine design but Holmes improperly uses '582 Patent teachings, i.e., hindsight. (§II.A.2.-above). Holmes argues to create bicolor just double Durosite's 300 LEDs. Ex.1049-Holmes-Supp., ¶38. Assuming a POSITA were trying to convert Durosite into bicolor, it is much more likely that one half the 300 LEDs would be warm, and the other half cool since the LED layout already uses the entire board.

Durosite was only 17W for 300 LEDs in mono-color. Ex.1001- C2:Ls.47-50. Durosite, after losses, would not output 1000 lumens. (§II.A.4-above). By contrast, Macias Example 1 uses 42W. Ex.1001-C10:L27.

Durosite had unknown G/M bias and CRI so is meaningless to a POSITA. (§II.A.4-above.)

Doubling Durosite's 300 LEDs (not part of Grounds 1 or 2) also would conflict with Hasnain's LEDs spaced "one to two inches." Ex.1008-Hasnain-C6:Ls.38-40. Six hundred LEDs one inch apart won't fit a 4' x 1.5" tube.

Holmes asserts failure to consider bicolor selectivity. Ex.1049-Holmes.Supp., ¶39. Dr. Allen listed the bicolor claim elements (1[b]-[d], 1[g], 1[j](i)) and referenced selective color output (bicolor) including modes putting about twice the wattage through half the LEDs compared to mono-color. Ex.2080-Dr.Allen, ¶s 11, 85.

Holmes quotes Dr. Allen's testimony (Ex.1039-Dr.Allen.Depo., @128:15-24) but mis-explains it. Ex.1049-Holmes.Supp., ¶s 37,40. The question Dr. Allen was answering was what the '582 Patent **teaches a POSITA (hindsight)**; not what a POSITA would know **absent the '582 Patent.** Further, Dr. Allen's use of "not challenging" refers to "each LED has to carry less current," meaning not challenging **the LEDs' performance** rather than, as Holmes incorrectly suggests, being easy to conceive and make the claimed bicolor. Ex.1039-Dr.Allen.Depo., @128:15-24.

Petitioner interprets Macias' specifications/testing testimony contrary to the '582 Patent. Reply, p.17, citing Ex.1047-Macias.Depo., @321:7-16 (Macias got

LEDs from manufacturer). But see, §II.A.2. (testing of **constructed** luminaire); especially, **§II.A.6(iii) ('582 selection/testing one-by-one after receiving LEDs);** §III.B.1. (Dr. Allen's interpretation of '582 selection/testing).

V. SECONDARY EVIDENCE

A. Colt's Products Are Coextensive

Petitioner argues that Colt markets unclaimed features defeating co-extensiveness. Reply, §V.A., pp.18-20. But most important, the product marketed is Colt's Bicolor T12 LED light system, which is what is claimed. Ex.1001-claim 1 ("An LED light system…suitable for a commercial image recording, in a form factor of a fluorescent light tube lamp….") That Colt's product embodies Claims 1 and 12-13 was shown and unchallenged. Ex.2051-Hoffman, ¶s5-6; Ex.2053-claim chart, pp.1-10; Ex.2068-Macias, ¶39. A perfect match is not required:

> [W]e have never held that the existence of one or more unclaimed features, standing alone, means nexus may not be presumed…. [W]hat we do require is that the patentee demonstrate that the product is essentially the claimed invention.

Fox Factory, Inc. v. SRAM, LLC, 944 F.3d 1366, 1394 (Fed.Cir. 2019).

Petitioner argues Colt's product is not "essentially the invention" (Reply, pp. 19-20) alleging unclaimed features "materially impact the functionality," thus no

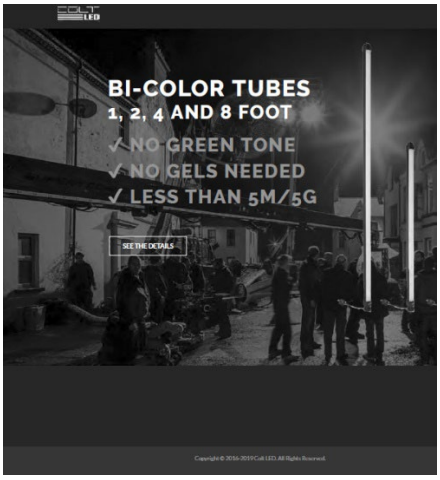
nexus, citing *Fox Factory*. Reply, p.20, Ls.1-4. But *Fox Factory* says:

> A patent claim is not coextensive with a product that includes a "**critical**" unclaimed feature **that is claimed by a different patent and that materially impacts** the product's functionality….

Id., at 1376 (emphasis added). In *Fox Factory*, patent owner described the unclaimed feature as "critical" and that same feature was claimed by a different patent. *Id.* But Petitioner presents no evidence of critical unclaimed features or another patent.

Regardless, Petitioner fails to show unclaimed material features for the **relevant Film/TV market**. Petitioner only cites third-party Wamco's website benefits listing. Ex.1049-Holmes.Supp., ¶s 60-62. Petitioner/Holmes argue these benefits materially impact functionality because Wamco's webpage lists them as "**Benefits.**" Reply, p.19-bottom; Ex.1060. But Wamco markets to **aerospace and aircraft customers**, not Film/TV (not "commercial image recording" of elements 1[pre],1[j]). Ex.1047-Macias.Depo., @200:1-10 (Wamco aerospace/aircraft lighting).

Petitioner presents no evidence that Wamco's listed benefits are "critical" (or even "material") for Film/TV. By contrast, Colt markets what is critical: bi-color tube, G/M<5, high CRI, light output:



Ex.2069

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

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Ex.2077, p.2

Colt's marketing shows the claimed important features for Film/TV. Ex.2068-Macias, ¶s 10,19, Exs.2072, 2077; also, Ex.2041-Csernecky, ¶s 13-14; Ex.2067-Wonderlick, ¶s12,14; Ex.2066-Silva, ¶s 10-11. Even Quasar prominently marketed these features. Ex.2075, p.1 ("highest lumens per watt," "95+ CRI" and "0CC (no Magenta or Green spikes).")

Even if not presumed, nexus exists because Colt marketed the claimed invention's elements. See, Ex.2069, Ex.2077, p.2; Claim 1[j](i)-(iii) (1000+ lumens; G/M<5; CRI>90); 1[d](selective warm and cool); 1[f] (FFF/T-12); 1[b]-1[c] (bicolor). Note that Petitioner does not challenge Patent Owner's entitlement to Quasar's sales. See, Patent Owner Response ("POR")(Dkt.#29-confidential); (#47-public), §XI.E.2., pp.56-57; Ex.2093-Interrogatory Responses (Quasar 2017 revenue pp.10-11); Ex.2068-Macias, ¶s 29-34, esp. ¶33 (estimate pre-2017).

B. Patent Owner Established Sales Were a Direct Result of the Claimed Invention

1. The WBIP "Invention as a whole" standard applies

Petitioner argues sales were not a direct result of claimed unique characteristics. Reply, p.20. But, per the Federal Circuit, patentee need only tie the objective evidence to the **invention as a whole** (for consistency with 35 U.S.C. §103), noting: "This is especially true for situations like those at issue here, where the claimed invention is, admittedly, a **combination of elements that were known individually in the prior art**." *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1331-32 (Fed.Cir. 2016)(emphasis added). Here, both Patent Owner and Petitioner agree claim 1 comprises individually known elements. (§III.A.5-above).

2. The aluminum housing is irrelevant

Petitioner argues the "aluminum housing" is the only new element. Reply, p.21-top; Ex.1049-Holmes.Supp., ¶s 34-35. But this argument incorporates multiple misconceptions and distortions. (§II.A., especially, §II.A.6 explaining distortions); Ex.2080-Dr.Allen, §I, ¶s 17-34 (lumen penalties), §II, ¶s 35-62 (thermal issues).

Petitioner presents no evidence that aluminum housings (not even in claim 1) motivate Film/TV customers. §V.A.-above (actual desirable features/reasons)).

C. **Market share**

Petitioner criticizes Csernecky's statement that over half the productions he worked used Colt's or Quasar's bicolors. Reply, p.21-middle.

Csernecky and others support substantial market presence:

"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 (emphasis added).

"Since introduction…, it has been used in about 90% of all new productions that Paramount supplies [equating] to 18 of 20 of the new productions per year." Ex.2067-Wonderlick, ¶14.

"[R]arely seen any productions using fluorescent tubes…last three to four years." Ex.2041-Csernecky, ¶18.

"Colt's Bicolor Tube light has completely replaced fluorescent tube lights as the standard at Paramount." Ex.2067-Wonderlick, ¶16.

Even other big studios rented Colt's product from Paramount. Ex.2068-Macias, ¶20.

D. **Copying**

Petitioner asserts Zhang's 2018 declaration (Ex.2036) and 2018 deposition transcript (Ex.2079) conflict on whether he received Colt's product from Gonzalez

or Lau. Reply, §V.C., pp.21-22. But both Gonzalez and Lau were with Quasar.[8] More importantly, Zhang's deposition testimony that Lau provided Colt's product to copy is uncontroverted. Ex.2079-Zhang.Depo. @14:24-15:4 (Lau not satisfied with initial product); *Id*.@15:22-16:3 (sample from Lau to take apart); *Id*.@20:3-7 (sample from Lau to copy). There is additional corroboration with uncontroverted evidence that Quasar's Gonzalez obtained sample Colt products from Silva. Ex.2066-Silva, ¶s 15-16. There even are photos of Colt's products disassembled (below). Ex.2079-Zhang.Depo., @PDF95: POR, #29/#48, pp.53-55 (PDF@61-63) (Zhang deposition excerpts evidencing copying).[9]

[8] Quasar Science LLC was the entity that Real Party in Interest The Vitec Group (now Videndum plc) bought and created Petitioner Quasar Science LLC. Petition, p.4-listing Videndum; Ex.2021-name change: Vitec to Videndum; Ex. 2019, p.1-Vitec purchase.

[9] Petitioner asserts Zhang's 2018 transcript (Ex.2079) is hearsay. Reply, p.22, fn.6. But Petitioner didn't object. See, IPR docket. The transcript is under oath, Petitioner's predecessor questioned Zhang (Ex.2079, @76:12+), and corroborating evidence discussed above would satisfy FRE 807 (residual exception).

Ex.2079, @PDF95.

Petitioner presents Gonzalez's terse declaration that he never met or instructed Zhang to copy. Reply, pp. 22-23; Ex.1059-Gonzalez. But Petitioner and Gonzalez **never** contradict that Zhang received Colt's products from Quasar to copy. Petitioner did not submit any denials from Lau. Patent Owner's claim charts showing Quasar's products match Colt's claims are undisputed. Ex.2051-Hoffman,

¶12; Ex.2059 (claim chart).

Petitioner asserts Zhang and Macias have competing declarations in unrelated case, Laysion v Colt, a commercial dispute (resolved) concerning an alleged oral order from Colt. Ex.1040, p.3:L.3 ("verbally ordered" allegation); Ex.1047-Macias.Depo., @288:4-9 (dispute resolved). Zhang and Colt's business dispute including factual disagreement does not change corroboration explained above including the photo of disassembled product.

E. Long-Felt Need

Petitioner attacks long-felt need arguing Baxter made concessions about Litepanels. Reply, §V.D., pp.24-25. But Petitioner provides no evidence that Litepanels' bicolor LED **panel** competed with Colt's tubes. Petitioner also says Baxter said Colt's tubes "are not really used that much in the industry." Reply, p.25:Ls.4-5. But Baxter is **not** a commercial success witness. He left Litepanels shortly after Colt's product introduction. (§III.B.2.-above (Baxter left Film/TV 2014)). Colt's product eliminated decades changing out tubes and gels. Ex.2066-Silva, ¶7.

F. Combined Secondary Evidence

Petitioner individually attacks, but 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). Colt has substantial secondary evidence summing to convincing evidence. (POR, §XI, pp.42-59).

VI. 42+ WATTS INPUT IS EXTREME FOR A COVERED TUBULAR LUMINAIRE

For claims 12-13, 29-30, Petitioner argues well-known, trivial thermal concerns, citing only Holmes' conclusory, attorney argument. Reply, §V, p.25, citing Ex.1049-Holmes.Supp., ¶s33-40.

A POSITA would avoid extreme input power like 42W. Going from 22W to 44W doubles power loading, doubling heat. Ex.2080-Dr.Allen, ¶54. Since a POSITA would not want to risk damaging LED quality (§III.A.4.-above), a POSITA would lack motivation to modify Kit's or Ducharme's devices by Hasnain's suggested power input and would lack a reasonable expectation of success especially since Hasnain is incompatible with a cover and housing. (§III.A.1.-3.-above; Ex.2080-Dr.Allen, ¶s 35-68, esp. 63-68 (re 42W input).)

Kit's disclosure that Cree's mono-color (announced but unintroduced) luminaire "**should** consume 28 watts" (Ex.1004-Kit-C6:Ls.25-27)(emphasis added)(Reply, p.26) appears speculative and still **not anywhere near 42W**. There is no evidence that it was covered or housed, or what green bias and CRI were.

Ex.1004-Kit-C6:Ls.25-27. A POSITA would disregard this postulated 28-Watt Cree lamp. Ex.2080-Dr.Allen, ¶s 74-86, esp. 74-75.

A POSITA would not use 28 watts in a covered, housed bicolor LED lamp with high quality LEDs for Film/TV. (§III, esp. III.A.4.-above.)

Most telling: Durosite was only 17W (§II.A.4.-above) and Katzir preferred 14W (Ex.1007-Katzir [0026]). Petitioner's proffered actual Film/TV LED tube, Mac Tech, was even lower wattage (**only 10W**). (§IV.A.2-above). Claims 12-13 and 29-30 are over four times that!

VII. CONCLUSION

Judgment confirming patentability of all challenged claims is respectfully requested.

Dated: June 26, 2024

By: /David L. Hoffman/
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VIII. CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the foregoing **PATENT OWNER'S SUR-REPLY TO PETITIONER'S RESPONSE** complies with the type-volume requirements of 37 C.F.R. § 42.24(b)(2) because it contains fewer than 5600 words, excluding the parts exempted under 37 C.F.R. § 42.24(c), as measured by the word-processing system used to prepare this paper.

Date: June 26, 2024

Respectfully submitted,
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Attorneys for the Patent Owner
/David L. Hoffman/
David L. Hoffman, Reg. No. 32,469

IX. CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing **PATENT OWNER'S SUR-REPLY TO PETITIONER'S RESPONSE** was served on June 26, 2024, via email directed to counsel of record for Petitioner at the following:

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