Topic 15

Case Study : Holophane (Acuity brand)

Holophane Industrial Lighting – Operating Ambient Temperature Range

This document provides a consolidated overview of the operating ambient temperature ranges for Holophane's major industrial lighting series (HOLOBAY, Phuzion, Vantage, Hazardous series). It also includes wattage ranges, application notes, and distinctions between standard, high-temperature, and remote-driver configurations.

Product Series / Model	Wattage Range (W)	Operating Ambient Temperature Range	Notes / Application Conditions
HOLOBAY Standard (Small Driver Box)	100–350 W	-40°C to 45–65°C	Max ambient depends on lumen output: up to 65°C for low wattage, ~45°C for high lumen packages.
HOLOBAY High Temp (Large Driver Box)	150–350 W	-40°C to 80°C	Requires 24 in clearance above fixture to achieve 80°C. High lumen packages limited to ~60°C.
HOLOBAY Remote Driver	150–350 W	-40°C to 80°C	Driver relocated to cooler zone; LED head can withstand 80°C ambient. Used for cranes / extreme heat zones.
Phuzion PHZ (incl. PHZC Crane)	150–500 W	-40°C to 70°C	Heavy-duty wet-location high bay. PHZC reinforced for crane/vibration. Suitable for steel and forging plants.
Phuzion PHZL (Large High Bay)	300–750 W	-40°C to 65°C (glass) -40°C to 60°C (acrylic)	Up to 100,000 lm. Glass optic allows 65°C; acrylic limited to 60°C. Used in aircraft hangars, tall bays.
Phuzion PHV	200–600 W	-40°C to 65°C	Die-cast sealed housing. IP65/66/NSF certified. Suitable for chemical, food processing, and hot/wet environments.

Phuzion PHS	150–400 W	-40°C to 50°C	14% uplight to reduce cave effect. More for warehouses/sports arenas; not for extreme heat zones.
Vantage LED (Standard)	120–350 W	-40°C to 55°C	IP65/66/67, IP69K. Designed for food/beverage cleanroom environments.
Vantage LED (High CRI / EM options)	120–350 W	-40°C to 45°C (standard) -20°C to +30°C (with EM)	High CRI reduces max ambient to 45°C. Emergency battery limits ambient to ~30°C.
Hazardous Location (HEXF/HEXS)	100–400 W	-40°C to 60°C	Class I Div.1, UL844 certified. Meets T-code limits. For petrochemical and explosive environments.

Summary

Industrial / Hazardous Location LED Drivers – Tc and Ta Specifications

Brand / Series	Output Power Range	Max Ambient Temp (Ta)	Max Case Temp (Tc)	UL Certification	NEMA SSL-1/17/18 Compliance	Dimming Support	Other High Temp / Safety Features
Mean Well HLG Series (e.g., HLG-320H)	60W – 600W	-40 to +55–60°C (depending on load, Tc ≤ 90°C)	90°C	UL8750, Type HL (Class I Div 2), UL1310 (Class 2 for some models)	Yes (≥2.5kV surge, designed per SSL-1/17/18)	0-10V / PWM (3-in-1), optional DALI	IP65/67 metal housing, fanless cooling, OTP protection, >60k hrs, 7-year warranty
Mean Well HBG Series (Round High Bay)	60W – 240W (up to 300W)	-40 to +70°C (ambient)	80–85°C	UL8750, many models Type HL (Class I Div 2)	Yes (surge ≥4kV, meets SSL-1 robustness)	3-in-1 dimming, DALI versions available	IP67 sealed, aluminum housing, Ta up to 70°C, SCP/OVP/OTP protection
Inventronics EUM Series (Programmable)	30W – 480W	-40 to +55–60°C (Tc ≤ 90°C at full load)	90°C (derating >75–80°C)	UL8750, UL Class P, Type HL (Class I Div 2)	Yes (6–10kV surge, ANSI C82.77, SSL-1/17/18)	0-10V, PWM, Timer dimming, DALI-2/D4i (BG suffix)	Compact metal housing, SCP/OVP/OTP, 12V aux power, >100k hrs @ Tc 70°C
Philips Advance Xitanium Series	40W – 150W	-40 to +55°C (may derate if Tc < limit)	80–85°C	UL8750, UL1310 (Class 2), CSA	Yes (meets SSL-1, SSL-17/18, 6kV surge)	0-10V (150µA source), some DALI-2	AOC (adjustable current), MTP (thermal protection), 50k hrs @ Tc 75°C
Osram Optotronic Series	30W – 150W	-40 to +55°C (some to +70°C)	85–90°C	UL8750, UL Class 2/P, Type HL	Yes (2.5kV surge, meets SSL-	0-10V, DALI-2, 12V aux output	Programmable current, AstroDIM,

				(C1D2)	1/17/18)		NTC, 50k hrs @ Tc 75–85°C
Tridonic Outdoor / Industry (EXC/PRE)	60W – 150W	-20 to +70°C (load dependent)	85–90°C	EN61347, UL Class P, Type HL (NA models)	Yes (meets SSL-1/17/18, industry tested)	DALI-2, 0-10V, SwitchDIM	Industry ITG (temp guard), IP20–67, up to 100k hrs @ Ta 50°C

Analysis of Tc vs Ta in High Ambient Temperature Conditions

In practical thermal conditions, if the ambient temperature (Ta) has already reached +70 °C, then the Tc of a high-power LED driver cannot possibly be only 15–20 °C higher than Ta, unless:

1. The driver load power is significantly reduced (for example, only operating at 30–40% power),
2. The housing is exceptionally large with unusually high thermal efficiency (e.g., the entire luminaire housing serving as a heat sink),
3. Or the datasheet's Tc is a "permissible maximum," but in practice the driver will automatically derate at that Ta to avoid exceeding it.

Why is Tc–Ta unlikely to be this small?

• Driver power loss formula:
$P_{loss} = P_{out} \times (1/\eta - 1)$
Example: For a 150W driver with 92% efficiency,
→ Power loss ≈ 13W.

• Thermal resistance ($R\theta$ c-a): Case-to-ambient thermal resistance is typically 2–4 °C/W.
→ $\Delta T = 13W \times 2.5 \approx 32$ °C.

• Result: Tc ≈ Ta + 32 °C = 102 °C.
→ This is much more realistic.

Why do datasheets often state "Ta = 70 °C, Tc_max ≈ 85–90 °C"?

Because manufacturers are quoting **theoretical allowable limits**:
• Meaning: "As long as you keep Tc ≤ 90 °C, the driver is compliant."
• But under full load in a 70 °C environment, this is not achievable — the driver must be derated.
• Therefore, when datasheets write "operable at 70 °C (depending on load)," the actual meaning is:
The driver can run at 70 °C, **but only with a significant power derating**.

✅ **Conclusion**:

You are absolutely correct — at Ta = 70 °C, a high-power driver's Tc can never be just 90 °C.
The real temperature rise must be ≥ 30 °C or even more.
Only **low-power drivers (≤30–50W)** can realistically keep Tc ≤ 90 °C when operating at Ta = 70 °C.