

Incident Summary #II-901832-2019 (#15107) (FINAL)

SUPPORTING INFORMATION	Incident Date	April 3, 2019	
	Location	Pitt Meadows	
	Regulated industry sector	Electrical - Low voltage electrical system (30V to 750V)	
	Impact	Qty injuries	0
		Injury description	None
		Injury rating	None
	Damage	Damage description	Major damage to two light fixtures and damage to a pallet of stored materials.
		Damage rating	Major
	Incident rating	Major	
Incident overview	Two separate fires within approximately one week of each other occurred on two linear fluorescent tube style luminaires with electronic ballasts that were retrofitted with 6 Universal brand light emitting diode (LED) tubes each and clear covers in the high ceiling of a storage warehouse.		
INVESTIGATION CONCLUSIONS	Site, system and components	<p>Fluorescent luminaires utilize ballasts which convert line voltage to levels that effectively start and maintain light output for fluorescent tubes.</p> <p>The fixtures from this site employ program start electronic ballasts which are designed to apply power to the fluorescent tube filament first allowing the cathode to preheat and then applying voltage to the lamps to strike an arc. Once started the filament voltage is reduced.</p> <p>A variety of options have become available to retrofit existing fluorescent luminaires with LED tubes, for this site UL Type A LED tubes were installed: (UL Type A) Utilize existing electronic ballasts if compatible (UL Type B) Have integral drivers within the tube to connect directly to line voltage (UL Type C) Have LED drivers that are separate from the tube</p> <p>For this site some light fixtures had six Universal retrofit LED's installed while some light fixtures had six TCP retrofit LED's installed</p> <p>Manufacturers installation instructions and specifications must be followed to ensure safe operation of retro fit LED tubes. Ballast compatibility charts confirm coordination between specific electronic ballasts and LED tubes. Where compatibility is unknown, the manufacturer should be consulted.</p>	
	Failure scenario(s)	Overheating due to incompatibility between the existing ballasts and the LED tubes breaking down the electronic components of the LED tube, creating high resistance, heat and fire igniting the LED tubes and clear covers.	
	Facts and evidence	Figure 1 – Video of light fixture on fire Figure 2 – LED tube warning labels -The LED tube specified to consult the manufacturers website for ballast compatibility Figure 3, 4 – Fluorescent ballasts (4 & 2 tube)	

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	<p>Figure 5, 6, 7 – Ballast compatibility charts Figure 8 – Light fixture damage Figure 9, 10 – LED tube damage before and after Figure 11 – Storage damage Figure 12 – Example light fixture</p> <p>-The on-site electrical contractor reported two light fixture fires, the second fire of a similar nature to the one in the video and within 1 week of the above incident date</p> <p>Non-contributing factors: -There were heaters in the area of the luminaires but they were pointed away from the luminaires and as such were unlikely a factor -There was no evidence available of unseated tube terminals on the fixture tombstones so this is not considered a likely contributing factor -There was no evidence available of incorrect wiring</p>
<p>Causes and contributing factors</p>	<p>It is very likely that the LED tubes incompatibility with the existing ballasts was the cause of the fires</p> <p>Contributing factors: -The manufacturers installation instructions and warnings were not followed during installation -The clear solid covers provided additional fuel to the fire</p>



Figure 1 – Video, Warehouse light fixture on fire. Video was taken by a worker around April 2019. Clicking image above will direct you to the video on Technical Safety BC'S YouTube channel.

Figure 2 – LED Tube warning labels – “Consult for list of compatible ballasts/ caution risk of fire”



Figure 3, 4 – Ultrasave fluorescent ballasts one 2 tube & one 4 tube per each light fixture

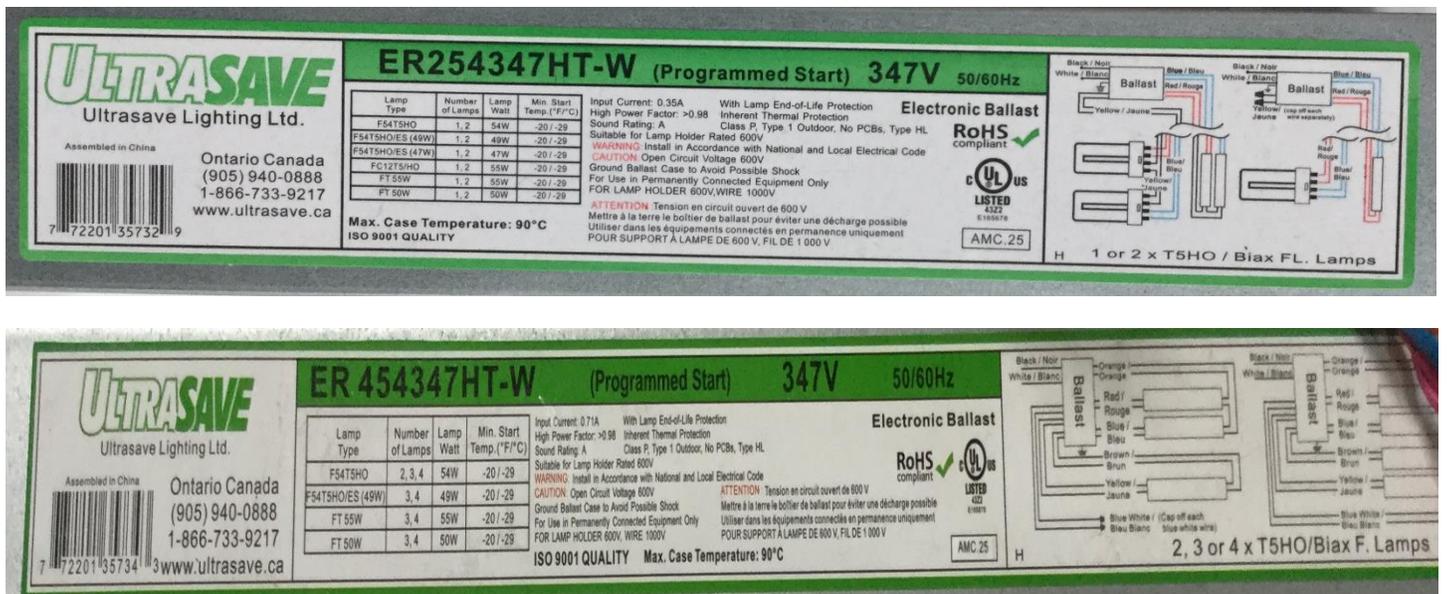


Figure 5 – Universal Everline Ballast Compatibility Chart (Ultra Save Ballasts not indicated). Note: See warning in red rectangle



Everline LED Lamp & Ballast Compatibility List



T5HO: Compatible Ballasts for T5LDR4F25/8xxA Series of LED Tubes

Ballast Brand	Part Number
Fulham	RHA-UNV-254-LT5
General Electric	GE254MVPS-D-1
Keystone	KTEB-254HO-UV-PS/A
Keystone	KTEB-454HO-UV-PS
Osram Sylvania	QHE 2x54T5HO/UNV PSN
Osram Sylvania	QTP 2x54T5HO/UNV PSN
Osram Sylvania	QTP 2x54T5HO/UNV PSN HT
Osram Sylvania	QTP 2x54T5HO/UNV PSN 80-SC
Osram Sylvania	QHE 4x54T5HO/UNV PSN HT SCL
Osram Sylvania	QHE 2x54T5HO/347-480PSN HT
Osram Sylvania	QTP 4x54T5HO/UNV PSN HT W
Osram Sylvania	QHE 4x54T5HO/UNV PSN HT SCL
Osram Sylvania	QTP 2x54T5HO/347-480 PSN HT
Osram Sylvania	QTP 4x54T5HO/347-480 PSN HT
Philips-Advance	E11/254A26
Philips-Advance	ICN-2S54
Philips-Advance	ICN-2S54-D
Philips-Advance	ICN-2S54-N
Philips-Advance	ICN-2S54-T
Philips-Advance	ICN-2S54-90C
Philips-Advance	ICN-2S54-90C-N
Philips-Advance	IZT-2S54-D
Philips-Advance	ICN-4S54-90C-2LS-G
Philips-Advance	ICN-4S54-2LS-H
Philips-Advance	HCN-2S54-90C-WL
Philips-Advance	HCN-4S54-90C-2LS-G
Standard	E154T5PS120-277/N/HO
Standard	E245T5HOPS120-277/N/XTRM
Standard	E454T5HOPS120-277/N/XTRM
Standard	E254T5HOPS347/N/XTRM
Standard	E454T5HOPS347/N/XTRM

Notes:

- Ballast compatibility is for the primary number of lamps being operated on the ballast. Consult Universal for de-lamp application compatibility.
- Ballasts must be wired per their exact wiring instructions to ensure compatibility.

Not using a lamp which is compatible with a ballast may lead to product failure which may result in dangerous conditions which could cause property damage or personal injury.

Everline LED replacement lamps have been tested to be compatible with the lists of ballasts shown on the chart by Universal Lighting. The ballast manufacturers listed have neither performed nor confirmed the testing. Testing by Universal Lighting will continue and the list will continue to be updated. If a ballast does not appear on this list, it does not mean that it is not compatible. Please contact Universal at 1-800-225-5278 about ballasts that are not listed.

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Figure 6 – Universal Everline Ballast Compatibility Chart (Ultra Save Ballasts not indicated)

Note: See warning in red rectangle



Everline LED Lamp & Ballast Compatibility List



T5HO: Compatible Emergency Ballasts for T5LDR4F25/8xxA Series of LED Tubes

Ballast Brand	Part Number
LOTA	ISL-540
LOTA	ISL-54
LOTA	I-320
LOTA	ELI-S-20
KEYSTONE	KT-EMRG-500
KEYSTONE	KT-EMRG-1400-SL
KEYSTONE	KT-EMRG-1300-T5
PHILIPS bodine	B50
PHILIPS bodine	ELI-S-20
PHILIPS bodine	LP600
PHILIPS bodine	B50ST

Notes:

- Ballasts must be wired per their exact wiring instructions to ensure compatibility.

Not using a lamp which is compatible with a ballast may lead to product failure which may result in dangerous conditions which could cause property damage or personal injury.

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Figure 7 – TCP Ballast Compatibility Chart (Ultra Save Ballasts not indicated)



**Electronic Ballasts
Compatible with 25.5 watt LED Direct5™**

BALLAST for FOUR LAMPS					
Brand	Model #	Four Lamp	Three Lamp	Two Lamp	One Lamp
ESPEN	VE454MVHRP	Y	Y	Y	N
KEYSTONE	KTEB-454HO-UV-PS	Y	Y	N	N
Osram/Sylvania	QHE 4x54T5HO/UNV PSN HT SCL	Y	Y	Y	Y
	QTP 4x54T5HO/UNV PSN HT W	Y	N	Y	N
	QHE 4x54T5HO/347-480 PSN HT SCL	N	N	Y	Y
Philips/Advance	ICN-4S54-90C-2LS-G	Y	Y	N	N
	HCN-4S54-90C-2LS-G	Y	Y	N	N
	HCN-4S54-90C-2LS-G	Y	Y	Y	Y
	HCN-4S54-90C-2LS-G-347V	Y	Y	Y	Y
ROBERTSON	PSB454T5MV	Y	Y	Y	Y
UNIVERSAL	B454PUNVHBE	Y	Y	N	N

BALLAST for TWO LAMPS				
Brand	Model #	Two Lamp	One Lamp	
FULHAM	RHA-UNV-254-IT5	Y	Y	
KEYSTONE	KTEB-254HO-UV-PS-SL	Y	Y	
	KTEB-254HO-UV-PS/A	Y	Y	
Osram/Sylvania	QHE2x54T5HO/UNV PSN	Y	Y	
	QTP2x54T5HO/UNV PSN HT	Y	Y	
	QTP 2x54 T5HO/UNV PSN	Y	Y	
	QHE 4* 54T5HO/347-480 PSN HT SCL	Y	Y	
Philips/Advance	ICN-2S54-N	Y	Y	
	ICN-2S54-T	Y	Y	
	HCN-2S54-90C-WL	Y	Y	
	HCN-2S54-90C-WL-347V	Y	Y	
	ICN-2S54	Y	Y	
	IZT-2S54-D	Y	Y	
	ICN-2S54-90C-N	Y	Y	
	HCN-4S54-90C-2LS-G-347V	Y	Y	
UNIVERSAL	B254PUNV-D	Y	Y	

Electronic Ballasts Not Recommended for use with LED Direct5 include:
 FULHAM: RHA-UNV-454-IT5, WH5-120-L
 GE: GE454MVPS90-F
 PHILIPS: IOP-2PSP54-SC
 Philips/Advance: IOP-4PSP54-2LS-G
 Advance HOP-4PS54-2LS-G-347V

Figure 8 – Luminaire Damage



Figures 9, 10 - LED Tube internal damage before and after

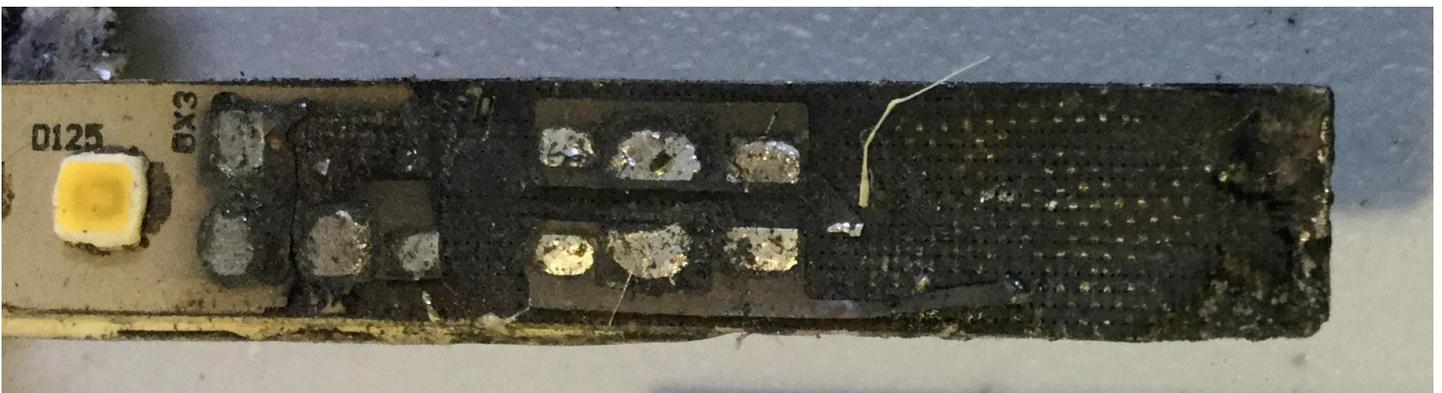
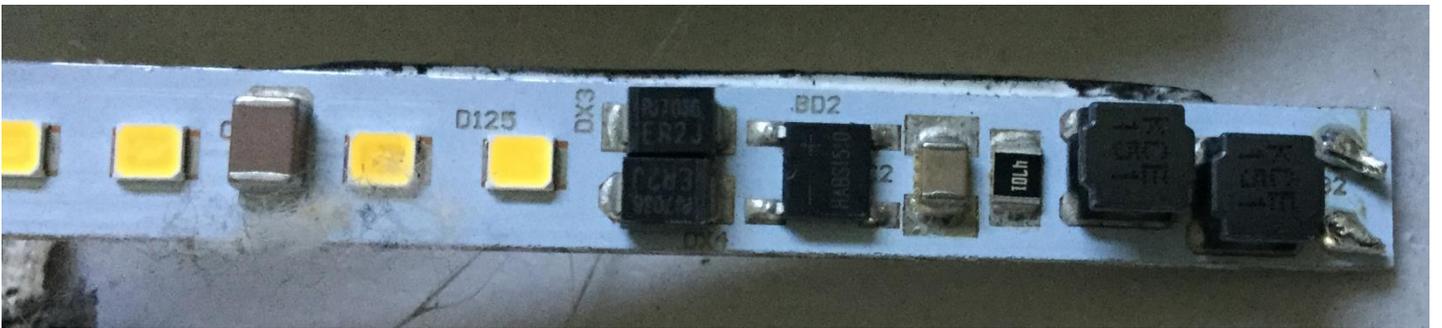


Figure 11 – Storage Damage



Figure 12 – Example light fixture

