

Annex

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) IN LIGHTING PRODUCTS – *Factsheet*



GLOBAL
LIGHTING
ASSOCIATION

MANDATORY (INTERNATIONAL) ELECTRICAL SAFETY STANDARDS GOVERNING PFAS USE IN LIGHTING PRODUCTS

PFAS are integral to many electronic components and production processes, making them essential to the functionality and durability of lighting products.

Preliminary research has identified a broad spectrum of over 50 PFAS compounds commonly used in generic electrical and electronic components for a wide range of electronic applications, many of which are also integrated into lighting products.

An internal survey with our GLA member organisations based on supplier data and available literature, indicated that PFAS are used in components for unique characteristics, listed in the table below.

Flame retardancy	Water and dust repellence
Dielectric strength	UV resistance
Chemical inertness and non-reactivity	Bonding properties
Low and high temperature and thermal resistance	Shatterproof/fragment retention protection
Flexibility	Minimisation of wear and tear for machinery and products

These unique characteristics are essential to provide safety, reliability and durability of lighting solutions, which are mandated by electrical and fire-safety standards issued by international standardisation bodies (e.g. ISO/IEC/EN/UL/CSA).

The list below contains electrical and fire-safety standards issued by international standardisation bodies. It is subject to change and will be updated in the event that new applications of PFAS in lighting products and their related safety standards are identified in future.

PFAS Type(s)	End-use Component	Reason for use	International & regional Standards
Polytetrafluoroethylene (PTFE)	Connectors	Fire Safety (Flame retardancy)	UL 94 UL 1694 IEC 60598-1 IEC 60947-7-4 IEC 60838-2-2 IEC 60998 IEC 62560 IEC 62776 IEC 62031
		Fire Safety (Anti-dripping)	IEC/EN 60695-2-10 IEC/EN 60695-2-11 IEC/EN 60695-2-12 IEC/EN 60695-2-13 IEC/EN 60695-11-20 IEC/EN 60695-11-5
Potassium nonafluorobutane sulphonate (often used with PTFE or other PFAS)	Power supply unit plastic housing	Fire Safety (Flame retardancy)	UL 94 UL 1694 IEC 61347
		Fire Safety (Anti-dripping)	IEC 60598-1 IEC 60947-7-4 IEC 60838-2-2 IEC 60998 IEC/EN 61558-1 IEC/EN 60695-2-10 IEC/EN 60695-2-11 IEC/EN 60695-2-12

			IEC/EN 60695-2-13 IEC/EN 60695-11-5 IEC/EN 60695-11-20 IEC/EN 60950-1
Perfluorobutanesulphonate PFBS (often used with PTFE or other PFAS)	Luminaire housing	Fire Safety (Flame retardancy)	UL 8750 UL 94 UL 1694
		Fire Safety (Anti-dripping)	IEC 60598-1 IEC 60838-2-2 IEC 60998 IEC/EN 60695-2-10 IEC/EN 60695-2-11 IEC/EN 60695-2-12 IEC/EN 60695-2-13 IEC/EN 60695-11-5 IEC/EN 60695-11-20 UL 1993 UL 1598 UL 746C
Polytetrafluoroethylene (PTFE)	Lamp base housing / module	Fire Safety (Flame retardancy)	IEC 62560 IEC 62031 IEC 62776
		Electrical Safety (Dielectric strength)	UL 1993 UL 746C
		Durability (Low and high temperature resistance)	
Polytetrafluoroethylene (PTFE)	Inductor and transformer	Electrical Safety (Dielectric strength)	UL 1446 IEC 60085
1-Propene, 1,1,2,3,3,3-hexafluoro-, oxidized, polymerized	Film capacitor	Reliability (Dielectric strength)	IEC 60384-1 IEC 60384-2 IEC 60384-14

			IEC 60384-17
• PTFE • Fluoroethylenepropylene (FEP) • 1-Hexene, 3,3,4,4,5,5,6,6,6-nonafluoro-, polymer with ethene and 1,1,2,2-tetrafluoroethene (ETFE) • Propane, 1,1,1,2,2,3,3-heptafluoro-3-[(1, 2,2-trifluoroethenyl)oxy]-polymer with 1,1,2,2-tetrafluoroethene	Cable insulation	Fire Safety (Flame retardancy)	UL 94 UL 1694 UL 1581
		Electrical Safety (Dielectric strength)	UL 2556 IEC 61347 IEC 60598-1 IEC 60947-7-4 IEC 60838-2-2
		Flexibility and crack avoidance (Temperature and UV-resistance)	IEC 60998 IEC 60695-11-5 IEC 60950-1 IEC/EN 60695-2-10 IEC/EN 60695-2-11 IEC/EN 60695-2-12 IEC/EN 60695-2-13 IEC 60085 UL 1446
• Polytetrafluoroethylene (PTFE) • Fluoroethylenepropylene (FEP) • 1-Hexene, 3,3,4,4,5,5,6,6,6-nonafluoro-, polymer with ethene • 1,1,2,2-tetrafluoroethene (ETFE) • Propane, 1,1,1,2,2,3,3-heptafluoro-3-[(1, 2,2-trifluoroethenyl)oxy]-, polymer with 1,1,2,2-tetrafluoroethene	Insulation sleeves	Fire Safety (Flame retardancy)	UL 94 UL 1694 IEC 61347
		Electrical Safety (Dielectric strength)	IEC 60598-1 IEC 60947-7-4 IEC 60838-2-2 IEC 60998
		Flexibility and crack avoidance (Low & high temperature and UV-resistance)	IEC 60695-11-5 IEC 60950-1 IEC/EN 60695-2-10 IEC/EN 60695-2-11 IEC/EN 60695-2-12 IEC/EN 60695-2-13 IEC 60085 UL 1446
• Polytetrafluoroethylene (PTFE) • Fluoroethylenepropylene (FEP)	Shrinking sleeves	Fire Safety (Flame retardancy)	UL 94 UL 1694 IEC 61347 IEC 60598-1 IEC 60947-7-4

1-Hexene, 3,3,4,4,5,5,6,6,6-nonafluoro-, polymer with ethene 1,1,2,2-tetrafluoroethene (ETFE) - Propane, 1,1,1,2,2,3,3-heptafluoro-3-[(1,2,2-trifluoroethenyl)oxy]-, polymer with 1,1,2,2-tetrafluoroethene		Electrical Safety (Dielectric strength)	IEC 60838-2-2 IEC 60998 IEC 60695-11-5 IEC 60950-1
		Flexibility and crack avoidance (Low & high temperature and UV-resistance)	IEC/EN 60695-2-10 IEC/EN 60695-2-11 IEC/EN 60695-2-12 IEC/EN 60695-2-13
Fluoroethylenepropylene (FEP)	Lamp protection sleeve	Customer safety (glass shattering protection)	IEC 61549 61549-IEC-810
PFAS	Ink	Durability (Water repellence, high temperature resistance, chemical inertness, and non-reactivity)	IEC 62035 IEC 61195 IEC 61199
1-Hexene, 3,3,4,4,5,5,6,6,6-nonafluoro-, polymer with ethene 1,1,2,2-tetrafluoroethene (ETFE)	Solar / PV Panel	Efficiency and durability (Water and dust repellence)	
Hexane1,1,1,2,2,3,3,4,4,5,5,6,6,6-tetradecafluorohexane	Glue / adhesive	Durability (Bonding properties, UV-resistance, chemical inertness and non-reactivity)	

- Fluoroethylene vinyl ether (FEVE) - Polyvinylidene fluoride (PVDF) - Polytetrafluoroethylene (PTFE)	Paint	Durability (Water and dust repellence, UV-resistance, chemical inertness and non-reactivity)	
- Homo-polymer of vinylidene fluoride (VDF) - Hexafluoropropylene (HFP)	Gasket / O-ring	Durability (UV-resistance, chemical inertness, and non-reactivity)	
- Perfluorocarboxylic acids containing 9 to 14 carbon atoms. - Perfluorooctanoic acid (PFOA) and its salts - Perfluorohexane-1-sulphonic acid - Perfluorooctane sulfonate (PFOS) - Perfluoroheptanoic acid and its salts - And many more	Switch, socket, plug and safety breaker	Fire safety (Flame retardancy)	IEC 60669 IEC 60884
- Polyvinylidene fluoride (PVDF) - Perfluoroalkoxyalkane (PFA) 1,1,2,2-Tetrafluoroethyl 2,2,3,3-tetrafluoropropyl ether - Polytetrafluoroethylene (PTFE)	Battery	Durability and efficiency (Binder properties)	
Perfluoropolyether (PFPEs)	Thermal shock testing	Electrical insulation (Thermal stability and	IEC 60068-14 NC, or MIL-STD-202G (107)

		chemical inertness)	
PFAS	Packaging paper	<i>Under investigation: Might be used for glossy effects</i> (Water repellence)	
		<i>Under investigation: Residue in recycled materials</i>	

ABOUT THE GLA

The Global Lighting Association (GLA) is the leading voice for the lighting industry worldwide, representing over 5,000 lighting manufacturers and generating \$75 billion in annual sales. Through its network of 27 national and regional lighting associations, the GLA advocates for policies and practices that promote sustainable lighting solutions, energy efficiency, and human well-being. The GLA is committed to fostering a collaborative environment that supports innovation, fair competition, and the growth of the lighting industry on a global scale.

This document is designed to provide advice and guidance for relevant stakeholders. It is subject to change or update without prior notice. The content is compiled based on the best available knowledge of participating GLA members, who cannot be held liable for any inaccuracies, omissions, or misinterpretations.

To learn more, visit our website at globallightingassociation.org

