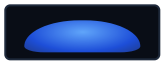
Technical Specification of Photoluminescent Materials

Comprehensive overview of chemical composition, particle size distribution (D50), luminance intensity, afterglow duration, and visual appearance for industrial and safety applications in compliance with European regulations (REACH, RoHS).

1. PLE-P Series – Long-Afterglow Aluminate Pigments

Chemical Composition & Properties: Rare-earth doped alkaline earth aluminate $Al_xSr_yCa_{(1-y)}O_z:Eu,Dy$. Engineered for rapid light energy absorption, high initial brightness, extended afterglow duration (up to > 12 hours), high thermal stability, and excellent weather resistance. Non-toxic, free of radioactive elements and heavy metals.

Model Code	Particle Size D50 (µm)	Afterglow Luminance (mcd/m²)		Afterglow Time	Glowing Color (Night)	Powder Appearance (Daytime)
		at 10 min	at 60 min			
PLE-P-Z-6B	65–85	725	120	> 12 hrs	 Yellow-Green	Light Yellow
PLE-P-Z-6C	45–55	480	85			
PLE-P-Z-6D	25–35	380	55			
PLE-P-Z-6E	5–15	280	39			
PLE-P-Z-6F	2–10	240	30			
PLE-P-Z-4B	65–85	640	105			
PLE-P-Z-4C	45–55	450	70			
PLE-P-Z-4D	25–35	320	42			
PLE-P-Z-4E	5–15	220	29			
PLE-P-Z-4F	2–10	190	23			
PLE-P-Z-2C	55–75	350	40			
PLE-P-Z-2D	15–45	250	32			
PLE-P-Z-1C	55–75	260	35	10 hrs		
PLE-P-Z-1D	15–40	200	25			
PLE-P-M-5B	65–85	700	120	> 12 hrs	 Blue-Green	Light Yellow
PLE-P-M-5C	45–55	480	85			
PLE-P-M-5D	25–35	360	58			
PLE-P-M-5E	5–15	260	38			
PLE-P-M-4B	65–85	630	110		 Blue-Green	Off-White
PLE-P-M-4C	45–55	440	75			

Model Code	Particle Size D50 (µm)	Afterglow Luminance (mcd/m²)		Afterglow Time	Glowing Color (Night)	Powder Appearance (Daytime)
		at 10 min	at 60 min			
PLE-P-M-4D	15–35	320	50			
PLE-P-M-4E	5–15	220	30			
PLE-P-M-3C	55–75	400	55			
PLE-P-M-3D	15–45	280	35			
PLE-P-M-1C	55–75	260	38	**10 hrs**		
PLE-P-M-1D	15–40	200	23			
PLE-P-F-6C	45–75	28	5.0	**3 hrs**	 **Purple**	**White**
PLE-P-F-6D	15–45	19	3.5			
PLE-P-M-9B	65–85	260	22	**8 hrs**	 **Blue**	**White**
PLE-P-M-9C	45–55	220	18			
PLE-P-M-9D	25–35	180	15			
PLE-P-M-9E	5–15	140	12			
PLE-P-M-8D	15–50	150	13	**6 hrs**		

2. PLE-PI Series – Photoluminescent Sand & Aggregate (Coarse Fraction)

Composition & Applications: Crystalline alkaline earth aluminate $Al_xSr_yCa_{(1-y)}O_z$:Eu,Dy in coarse granule sizes (mm). Designed for casting into epoxy and polyurethane resins, terrazzo, concrete mixtures, paving stones, landscape architecture, and pathway safety markings.

Model Code	Grain Size D50 (mm)	Afterglow Luminance (mcd/m²)		Afterglow Time	Glowing Color (Night)	Appearance (Daytime)
		at 10 min	at 60 min			
PLE-PI-Z-6A	0.5–2.0	1050	145	**> 12 hrs**	 **Yellow-Green**	**Light Yellow**
PLE-PI-Z-6BA	0.15–0.3	910	140			
PLE-PI-Z-4A	0.5–2.0	950	115			
PLE-PI-Z-4BA	0.15–0.3	820	110			
PLE-PI-M-5A	0.5–2.0	880	145		 **Blue-Green**	**Light Yellow**
PLE-PI-M-5BA	0.15–0.3	790	140			
PLE-PI-M-4A	0.5–2.0	770	130		 **Blue-Green**	**Off-White**
PLE-PI-M-4BA	0.15–0.3	700	120			

3. PLE-PY Series – Fast-Charging Pigments for Low-Illumination Environments

Composition & Characteristics: Specially modified alkaline earth strontium aluminate $Al_xSr_yCa_{(1-y)}O_z:Eu,Dy$ engineered for ultra-fast light absorption and easy excitation even under very low ambient light levels. Recommended for tunnels, underground garages, subways, underwater/marine applications, and emergency egress systems without direct daylight.
PLE-PY Series Test Conditions: D65 standard illuminant at an illuminance of only **25 lx** for **15 minutes** of excitation.

Model Code	Particle Size D50 (µm)	Luminance at 25 lx (mcd/m²)		Excitation (D65)	Glowing Color (Night)	Powder Appearance (Daytime)
		at 10 min	at 60 min			
PLE-P-Z-8CY	50–65	120	20	**25 lx / 15 min**	Yellow-Green	Light Yellow
PLE-P-Z-8DY	25–35	90	15			
PLE-P-Z-8EY	5–15	60	10			

4. PLE-PS Series – Sulphide Photoluminescent Pigments

Chemical Composition: Rare-earth oxysulphides or copper-activated zinc sulphide $M_xO_yS_z:Eu,Ln$ or $ZnS:Cu$. Suitable for indoor applications, textile screen printing, plastics, and decorative items requiring specific color emissions (red, orange).

Model Code	Particle Size D50 (µm)	Afterglow Luminance (mcd/m²)		Matrix Type	Glowing Color (Night)	Powder Appearance (Daytime)
		at 10 min	at 60 min			
PLE-PS-Z-4D	10–30	40	4.0	ZnS:Cu	Green	Light Yellow
PLE-PS-C-4D	20–50	20	1.0	Oxysulphide	Red	Light Red
PLE-PS-O-4D	20–50	22	1.0	Oxysulphide	Orange	Orange
PLE-PS-B-4D	15–45	170	27.0	Oxysulphide	Blue-Green	Light Grey
PLE-PS-OB-4D	10–45	25	1.2	Oxysulphide	Light Orange	White

5. PLE-PN Series – Fluorescent / Photoluminescent Pigments (Daytime Neon)

Composition & Properties: Aluminate core based on the PLE-P series combined with a luminescent color-dyeing surface treatment (uniform particle size D50: 25–35 µm). Delivers vivid neon coloration in daylight and under UV light alongside strong afterglow in complete darkness.

Model Code	Particle Size D50 (µm)	Afterglow Luminance (mcd/m^2)		Daytime Effect	Glowing Color (Night)	Powder Appearance (Daytime Neon)
		at 10 min	at 60 min			
PLE-PN-C-4D	25–35	180	26	Neon	Red	Neon Pink
PLE-PN-Z-4D	25–35	170	24	Neon	Green	Neon Green
PLE-PN-ZE-4D	25–35	200	28	Neon	Yellow-Green	Neon Yellow
PLE-PN-O-4D	25–35	180	26	Neon	Orange	Neon Orange
PLE-PN-M-4D	25–35	140	20	Neon	Blue	Neon Blue

Technical Notes, European Standards & Processing Guidelines

1. **Testing Methodology & Standards:** Afterglow luminance values (for PLE-P, PLE-PI, PLE-PS, and PLE-PN series) are measured in accordance with German and European standard **DIN 67510-1** (excitation by D65 standard light source at 1000 lx for 10 minutes, measured in mcd/m^2 after 10 and 60 minutes; afterglow time indicates the decay duration to the human eye visibility threshold of 0.32 mcd/m^2). The fast-charging **PLE-PY** series is tested at **25 lx for 15 minutes** (D65 source). Suitable for safety signage systems compliant with **ISO 17398** and **ISO 3864**.
2. **Water-Based Applications (-W Encapsulation):** Standard aluminate pigments (PLE-P, PLE-PI, PLE-PY series) react with water. For waterborne coatings, dispersions, and emulsions, we supply hydrophobic encapsulated grades (designated by suffix **-W**, e.g., *PLE-P-Z-6D-W* or *PLE-PN-Z-4D-W*).
3. **Processing Recommendations:** To preserve crystal integrity and achieve maximum luminance, avoid high-shear grinding (such as ball milling); disperse the pigment into transparent binders using low-speed mechanical stirring.
4. **Safety & EU Regulatory Compliance:** All listed materials are non-radioactive, free of lead, cadmium, and other restricted heavy metals, and fully comply with EU Regulation **REACH (EC No. 1907/2006)** and Directive **RoHS (2011/65/EU)**.
5. **Standard Packaging & Storage:** 1 kg in sealed PE bags or 25 kg in plastic pails. Store in a dry environment at 5–35 °C in original unopened packaging.