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To Enhance Your Building's Disaster Preparedness

- Clearly mark stairwells on every landing. Mention both floor number and stairwell designation, and indicate if the stairwell has roof access.

- Clearly mark the location of all utility valves/disconnects, especially fire protection systems. Also label electrical closets.

- Recommend secondary assembly areas one to two blocks away for evacuated tenants for major emergencies. Do not allow tenants to congregate in lobby areas.

- Call your local fire department and ask to what the building's pressure reducing valves (PRVs) should be set.

- Increase fire watches during floor renovations.

- Ensure adequate fire stopping of all building poke throughs. Seal them with approved fire-stopping material. Reapply fire-stopping material after renovation work.

- Provide the fire department with a full set of master keys for access to tenant spaces, utility rooms, stairwell doors roof access etc. Be sure each key is tagged and labeled as to what it opens.

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LOW LOCATION PHOTOLUMINESCENT ROUTING SYSTEMS
By Tom Joyce, Sales & Marketing Business Manager of Ontario, Johnsonite, Construction Canada 96 05

Evacuating the building can result in chaos when back-up lighting systems fail to illuminate hallways and stairwells. Most people panic and cannot overcome their fear enough to think clearly and logically how to exit the facility. Fire extinguishers, alarms, flashlights cannot be located quickly. Emergency exit escape routes may no longer be visible. In these situations, the potential for injury and the risk to life increases dramatically. time is of the essence as evident in the World Trade Centre bombing several years ago.

Existing Building Code requirements are generally set a minimum standards and may not, or only in a limited way, address egress and guidance pathways.
New Photoluminescent systems are now available which help compensate the shortcomings of current electrical systems while providing a new alternative in installing an enhanced, comprehensive Life/Safety system at an economical cost in a new or retrofit situation.

During the past decade, Photoluminescent Technology has greatly advanced in performance and design. there have also been sophisticated developments in the way Photoluminescent Technology is integrated into a variety of materials, including vinyl and rubber, creating new application possibilities.

Permalight AG - a globally recognized and respected pioneer in this field - in co-operation with Fire Department Chiefs in Germany and other European countries, have spearheaded the development of guidelines for a Safety Guidance system, visible in smoky and/or dark conditions.

These standards are now stipulated in the German Industrial Standard D.I.N. 67510, for Photoluminescent Escape routing. (Other European countries, Japan and California have or are in the process of adopting it or similar standards.) In addition, this system is mandatory on all N.A.T.O shipping and recommended by I.M.O. for passenger ships.

Research and development in the USA and Europe suggest that a Photoluminescent Escape systems (sic), if properly applied, can be more effective than emergency lighting in terms of cost, maintenance and as an aid (sic) evacuation .

Building evacuation in daylight, particularly if practical, rarely presents a problem. However, evacuation in dark or smoke conditions is another matter. Studies have shown that walking 30 to 40 yards in a straight line in familiar surroundings can take five times as long and ten or more times longer if there are impediments or corners.

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How Photoluminescence Works
Photoluminescent crystals (zinc sulfide) absorb and store light energy from various sources (incandescent, fluorescent, ultra violet). The crystals are generally charged within minutes, when exposed to a sufficiently strong light source. Zinc Sulfide based pigments have a yellow green colour during the glowing period. Since this matches the spectral sensitivity of the eyes, the pigments are capable of high luminance intensity and are therefore specially suited for routing, guidance and identification.

The stored energy is seen as a bright glow, in total darkness, when a light source is interrupted or obscured and is discharged over an extended period of time, generally several hours, after which the glow continues to emit light at an intensity of many times the human threshold of perception.

Zinc Sulfide crystals may be charged repeatedly and indefinitely provided they are undamaged and kept clean. There is no loss of initial brightness or longevity of luminescence.

Note: MERCURY or SODIUM vapour light will not activate zinc sulfide materials.

A photoluminescent routing sytem is designed to provide continuous, visible direction at a level close to the ground to help ensure orderly, expeditious, safe evacuation of a facility in the event of power failure or of smoke obscuring the exits or other disasters.

Additionally, the system may assist the Fire Department personnel entering a facility to extinguish a fire and/or to assist in evacuation by providing a guidance pathway in areas of darkness.

In addition, this system can also be enormously useful in highlighting access to critical equipment or controls during periods of sudden darkness caused by power failure or other emergency situations.

Photoluminescent systems are designed to support existing Emergency systems. Existing systems require electrical or battery power. In order to be operational and effective when required, these systems require regular and expensive maintenance. Even when fully operational, these systems provide little in the way of guidance and in the event of smoke, may be obliterated. Where power failures have occurred, it is not altogether unusual for back-up systems to fail completely or partially. Electrical or Battery Systems are not "fail safe."

In short, the purpose of Photoluminescent Escape/Guidance systems in the event of sudden darkness caused by the loss of power or smoke in building is to help minimize building occupants' disorientation and panic, by providing a low location Photoluminescent escape route marking system.

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Photoluminescent Escape routing systems are appropriate for commercial, Institutional, Public and Industrial buildings, either new or those facilities being refurbished. Escape routing systems can be installed as a complete system throughout a building , or in a (sic)similar trouble areas where Photoluminescent egress marking is necessary. Other areas in which a Photoluminescent system could be highly desirable and make an important contribution to Life/Safety are shopping malls, pedestrian underground spaces, parking garages, tunnels between facilities, etc.

One of the more important requiremen5ts of an effective Photoluminescent system is that it be available in a range of products which would enable the technology to be used in just about any part of a building.

Johnsonite (North America's leader in Vinyl and Rubber Floor and specialty flooring Products) integrates Photoluminescent Technology with aesthetics into it's wide range of flooring products resulting in a complete Photoluminescent low location escape routing systems that suits virtually any interior environment. The Photoluminescent system consist of stair treads and nosing, tile, wall base, handrails, corner guards, tapes, signage, hazard markings, paint, customized evacuation plans and direction indicators.

Low Location Photoluminescent Escape route systems is a serious Life/Safety and deserves the serious consideration of all those concerned with design and code development and in particular, building owners who bear the responsibility in ensuring that their building occupants can safely exist (sic)a building.

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Evacuate Without Fear When the Lights Go Out.

Photoluminescent emergency pathway marking systems bring a new level of safety to manufacturing environments.

By Arthur Forst and Robert Katz

Modern manufacturing plants are highly complex environments, packed with machinery, work centers, conveyors, shelves, storage bins, parts, supplies, overhead transport systems, furniture, computers and process control equipment. Throughout the plant in a constant state of movement and flux are the employees…line workers, assemblers, packers, supervisors, managers, support and administrative personnel.

Employees are typically trained to evacuate the building via the nearest exit. Under normal working conditions, occupants are guided around plant floor obstacles by a well-defined path of egress. Strategically posted evacuation maps define egress routes from the map locations to the exit doors.

During a fire and smoke or blackout emergency, fleeing occupants can become confused, disoriented and sometimes panicked. Under these conditions, the essential need to rapidly move employees from danger to safety in an orderly manner can be quickly compromised. A photoluminescent glow-in-the-dark emergency pathway marking system is a value-added complement to normal safety procedures that not only reduces confusion and panic, but also helps save lives by illuminating the path of egress.

RECENT DEVELOPMENTS

Two related developments recently forced photoluminescence to the forefront of awareness within the safety community.

· NFPA 101 LIFE SAFETY CODE: In December, 2000, a new clause in the 2000 Edition of the NFPA 101 Life Safety Code (Chapter 7, Section 7.10.7.2) eased and expanded the criteria for photoluminescent above-the-door exit signs to allow for their use in locations where the signs are continually exposed to a minimum light level while the building is occupied. The charging illumination on the sign must be a reliable light source as determined by the Authority Having Jurisdiction.

· UL STANDARD 924: The revised NFPA 101 Life Safety Code (see above) paved the way for adoption of the first-ever photoluminescent above-the-door exit sign standard. On July 11, 2001, Underwriters Laboratories published UL Standard 924 SUPPLEMENT SG - PHOTOLUMINESCENT EXIT SIGNS. This revised standard details stringent performance, durability and legibility criteria which a photoluminescent exit sign must meet to be certified in conformance with UL 924.

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Above-the-door photoluminescent exit sign listings to a UL 924 standard obtained prior to July 11, 2001 do not conform to the newly adopted standard and are now invalid.

The updated NFPA 101 code in combination with the corresponding UL 924 exit sign standard, for the first time, gives building owners, managers and occupants the choice to use an ETL- or UL-listed photoluminescent exit sign in place of electric and radioactive tritium above-the-door exit signs.

UNDERSTANDING PHOTOLUMINESCENCE

The photoluminescent glow-in-the-dark phenomenon comes from rare earth mineral crystals found in nature that have the unique capacity to absorb and store energy from ambient light. When the lights dim or go out, the absorbed light energy is released, and the crystals emit a luminous glow. The glow commences automatically without any human, mechanical or electrical intervention. It is precisely this automatic activation that renders photoluminescent products useful during an emergency.

Photoluminescent crystals are the basic component of glow-in-the-dark pigments. Two pigment types are used commercially.

NOVELTY-GRADE pigments are made with Zinc Sulfide crystals. Zinc sulfide pigments were developed in the 1940s and are now found primarily in toys and novelties. Some manufacturers continue to use zinc sulfide pigments inappropriately in a variety of safety products.

Authentic SAFETY-GRADE photoluminescent pigments made with Strontium Oxide Aluminate crystals became commercially available only a few years ago. Gram for gram, strontium oxide aluminate pigments glow ten times brighter and ten times longer than zinc sulfide pigments after exposure to the identical light. Long afterglow strontium oxide aluminate pigments are now widely acknowledged as essential to the effective performance of photoluminescent safety products.

PHOTOLUMINESCENT PERFORMANCE

All photoluminescent products require the presence of natural, fluorescent or incandescent light to charge and store light energy. The brightness intensity and afterglow of photoluminescent signs and markers depends on several factors:

· The type of pigment used. Strontium oxide aluminate pigment is the only pigment appropriate for safety products.

· Level of pigment concentration. A higher pigment concentration typically results in a brighter, longer-lasting afterglow.
· Intensity of the charging light and the duration of exposure. The brighter the charging light, the more energy is absorbed and the brighter the afterglow. As little as 5 foot-candle illumination (roughly equivalent to the light from a 15 watt incandescent bulb) should be sufficient to charge safety-grade photoluminescent signs.

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GLOW-TIME: SAFETY-GRADE photoluminescent signs and markers glow visibly for at least eight hours after all light has been extinguished. The NFPA 101 Life Safety Code and UL Standard 924 focus on the first 90 minutes of an emergency since that is the time when occupants are most likely to be evacuating a building.

PRODUCT LIFE SPAN: SAFETY-GRADE photoluminescent signs recharge fully in 30 to 60 minutes when light is restored, ready to glow again for another 8 hours. Photoluminescent pigments charge and discharge indefinitely and have no pre-determined life span. Depending on wear and tear and environmental conditions, the useful life of a photoluminescent sign can span 20 or more years.

PRODUCT FORMATS

Photoluminescent safety products are available in two basic formats:

· Flexible, pressure-sensitive self-adhesive peel-and-stick appliqués for concrete floors, wall-board, machinery and equipment.

Peel-and-stick markers are routinely used to denote direction of egress and the presence of obstacles. For example, disks with arrows adhered to the floor and wall guide occupants along egress pathways from their work-stations to the building exits. Strips of flexible photoluminescent tape adhered to machines and shelves glow in the dark to warn occupants of dangerous obstacles.

· Rigid signs and markers for installation on walls, doors and columns.

Rigid photoluminescent evacuation map signs direct occupants from a precise location (e.g., an elevator landing) to alternative evacuation routes. Other rigid photoluminescent signs point to exit doors, identify emergency evacuation stair letters and floor numbers, and pinpoint emergency equipment (e.g., fire extinguishers), areas of danger (e.g., high voltage), and areas of refuge.

EVACUATION ROUTE MAPS

Evacuation route maps are worthy of special attention. During an emergency, even the most familiar surroundings can become confusing. Fleeing occupants are often disoriented and encounter difficulty finding emergency evacuation routes and exits they casually pass through every day. Legible, uncomplicated evacuation maps can provide a lifeline to nervous, frightened occupants seeking a safe, reliable emergency egress route.

Evacuation route maps must be kept current. Space utilization within plant environments is dynamic and changeable. Equipment is routinely added and retired, and production lines are modified and relocated. Moreover, evacuation route maps, no matter how clearly rendered, are useless if they are invisible in the dark.

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To be reliable and effective, map signs must be legible in both light and dark environments and possess the design flexibility to accommodate constant evacuation route changes and updates. One cost-effective solution is to insert a removable transparent map between a photoluminescent background and clear protective cover and enclose the three components inside a frame. The map will glow in the dark, and the transparency can be readily updated and replaced when necessary.

WHERE TO INSTALL A PHOTOLUMINESCENT EMERGENCY PATHWAY MARKING SYSTEM

A typical photoluminescent system application calls for a combination of signs, strips and directional symbols strategically placed where they can be easily seen by building occupants and visitors. Photoluminescent pathway markings define all evacuation routes and provide visual guidance for safe, rapid, orderly egress. The glowing directional signs and symbols evoke comfort and alleviate confusion and panic in fire, smoke and blackout conditions.

· Figure 1 details the occupant corridor photoluminescent pathway marking system adopted by the ASTM as their implementation standard. This illustration can be interpreted as follows for a manufacturing plant installation.

1. Mark critical pathways from work centers to points of egress with either discrete floor markings spaced 12 to 24 inches apart or continuous wall board marking strips. When using discrete markings, place them on either side of the egress path to delineate a clear, unobstructed walkway to the exits.

2. Clearly mark leading edges of stationary and portable machinery, shelving and walls with photoluminescent appliqués. Photoluminescent signs should reveal conflict areas as well as obstructions that can impede evacuation and injure fleeing occupants.

3. Identify exits with both low-level (i.e., 12 inches above the floor) and UL 924-compliant above-the-door photoluminescent exit signs. Doors that are not exits or that lead to dead-ends should be marked as well.

4. Place photoluminescent code-compliant evacuation maps at strategic junctures along the paths of egress and adjacent to elevators.

5. Photoluminescent stairway identification signs in tactile and Braille format that conform to both local and Americans With Disabilities Act mandates should be placed on the occupant side of exit doors.

6. Permanent photoluminescent signs and markers should identify fire extinguishers, standpipe and fire hose locations, alarms, emergency telephones, first aid kits and first aid stations. Other signs should define danger areas that are difficult to see in darkness.

The potential for accidents is greater in stairwells. Ideally, a photoluminescent escape route, including the components shown on the diagram, should be installed from top to bottom in a continuous manner. This drawing is applicable to all buildings.

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In addition to manufacturing floors, public corridors and stairways, photoluminescent signs and markings should reveal routes of egress from back-of-house areas normally accessible to staff, but off-limits to the public. These locations include mechanical, electrical, telephone, elevator machine, switchgear and water equipment rooms.

SAFETY-GRADE PHOTOLUMINESCENT ADVANTAGES

Installation of safety-grade photoluminescent signs and pathway markers offers building owners and occupants a number of key advantages:

· Fail-Safe: SAFETY-GRADE photoluminescent signs and markers activate automatically the instant the lights go out and glow for a minimum of 8 hours. No human, mechanical or electrical intervention is necessary. The signs recharge automatically all the time, every time as soon as light is restored.

· Non-Electric: Photoluminescent signs are non-electric and need no hard-wired electric circuits to operate. They consume no power and, therefore, help conserve energy.

· Indefinite Life Span: The useful life of a photoluminescent sign is indefinite. The glowing pigments last forever. The glowing and recharging phenomena will continue as long as the sign is kept clean and has not been vandalized, defaced, marred or otherwise damaged.

· Maintenance-Free: Photoluminescent signs require no batteries, no periodic battery testing and no bulb replacement. Moreover, since photoluminescent signs last indefinitely, it is not necessary to record and track photoluminescent sign expiration dates.

· Non-Radioactive: Photoluminescent signs are non toxic, non-radioactive and environmentally friendly. Unlike expired tritium-powered exit signs, photoluminescent signs create no hazardous radioactive waste.

· Economical: Over the course of a 10-year installation, cost-effective photoluminescent signs save thousands of dollars in maintenance, testing, and electric power.

Photoluminescent Emergency Pathway Marking Systems are a recognized, method for improving plant safety. Be sure to insist on SAFETY-GRADE photoluminescent products made with Strontium Oxide Aluminate pigments. Do not accept Zinc Sulfide pigment-based novelty-grade products for safety applications. Finally, be sure all photoluminescent above-the-door exit signs you purchase are ETL- or UL-listed and conform to the UL 924 standard recently adopted on July 11, 2001.

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